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The thesis of this research is that the U.S. Army aviation engineer units played a crucial role in the success of General Douglas MacArthur's island hopping campaign in the Southwest Pacific Theater at the tactical, operational, and strategic levels. Allied victory depended on seizing lightly defended enemy territory and neutralizing enemy strongpoints from Australia to the Philippines through the following pattern: conduct air and naval bombardment, land the assault forces, defeat any Japanese units in the area, and construct airfields and base facilities. This research demonstrates that aviation engineer units rapidly constructed these airbases and provided the necessary facilities for land-based aircraft so that carrier-based aircraft could focus on protecting the navy's fleet.

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ENGINEER AVIATION UNITS IN THE SOUTHWEST PACIFIC THEATER DURING WORLD WAR II

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE
Military History

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

ENGINEER AVIATION UNITS IN THE SOUTHWEST PACIFIC THEATER DURING WWII, by MAJ Natalie M. Pearson, 133 pages.

The thesis of this research is that the U.S. Army aviation engineer units played a crucial role in the success of General Douglas MacArthur's island hopping campaign in the Southwest Pacific Theater at the tactical, operational, and strategic levels. Allied victory depended on seizing lightly defended enemy territory and neutralizing enemy strongpoints from Australia to the Philippines through the following pattern: conduct air and naval bombardment, land the assault forces, defeat any Japanese units in the area, and construct airfields and base facilities. This research demonstrates that aviation engineer units rapidly constructed these airbases and provided the necessary facilities for land-based aircraft so that carrier-based aircraft could focus on protecting the navy's fleet.

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INTRODUCTION

Little research exists that investigates the role of U.S. Army engineer aviation units and their contributions to General Douglas MacArthur's island hopping strategy in the Southwest Pacific Theater from 1941 through 1945. More than 60 years ago, military leaders recognized their accomplishments and were well aware of their contributions in support of operations at the tactical, operational, and strategic levels. As quoted in *Builders and Fighters*, a publication of the Engineer Office of History in Fort Belvoir, Virginia, MacArthur, commander of the Southwest Pacific Theater during World War II, told the Chief of Engineers in 1944 that "this is an air and amphibious war; because of the nature of air and amphibious operations, it is distinctly an engineer's war."[1] This thesis investigates contributions of engineer aviation units and how they shaped and sustained decisive operations in the Southwest Pacific from 1941 through 1945.

For the Allies and Axis powers, most of the Southwest Pacific possessed geographical significance (see figure 1); however, there were few strategic resources. For the Japanese, the Southwest Pacific would help secure its victories in Southeast Asia, expanding its regional hegemony. If the Allies gained control, the Japanese would be cut off from East Indian resources (oil and minerals). Therefore, existing airbases or future airbase sites became the tactical, operational, and strategic objectives for the Allies.[2]

Significant engineer aviation unit contributions began immediately after Japan's attack on Pearl Harbor, 7 December 1941. Only two engineer aviation battalions existed at that time in the Pacific Theater--the 804th Engineer Aviation Battalion (EAB) at Hickam Field in Oahu, Hawaii and the 803d EAB in Bataan and Corriegidor, the

Philippines.[3] The 803d EAB's ability to rapidly repair airfields, build defensive positions, and fight as infantry assisted in delaying the Japanese forces until May 1942 when American forces finally surrendered to Japanese forces.

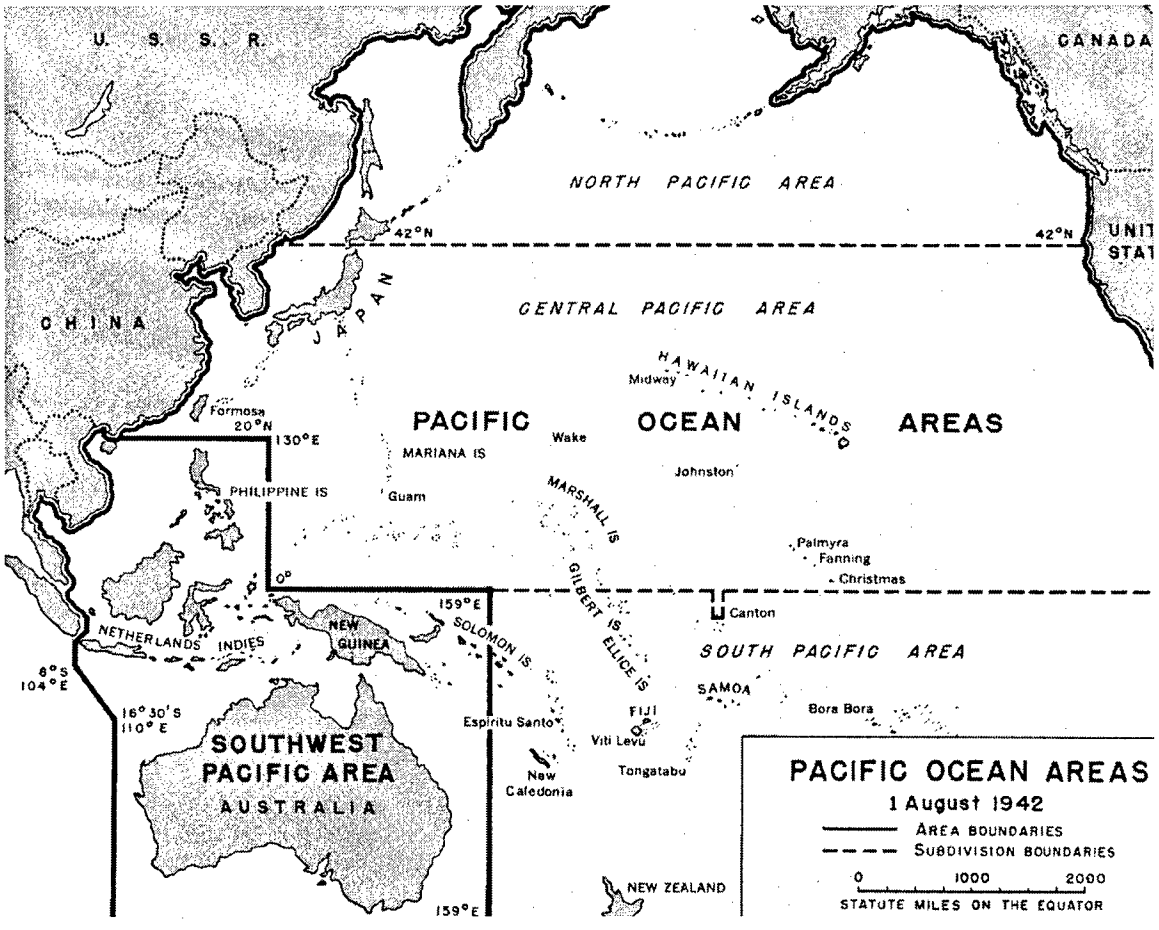

Figure 1. Pacific Ocean Map
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers: The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 129.

Engineer units such as the 808th Engineers headed for Australia from the United States by the end of December 1941, and they began airfield and airbase construction in Darwin in February 1942. Since Australia was the last major Allied post in the Southwest

Pacific, President Roosevelt directed General MacArthur to take charge of defending Australia. Consequently, U.S. forces moved toward a more aggressive strategy and prepared for offensive operations. From there, U.S. forces prepared for their first assaults in the Solomons and Papua New Guinea.[4]

Next, MacArthur's forces continued to drive toward Rabaul, New Britain Island. In June 1943, Allies seized islands just east of New Guinea, and engineers built airfields that would allow Allied air forces to launch air attacks on Rabaul. For example, General MacArthur ordered aviation engineers, the 871st EAB, to build airfields in the isolated Markham River Valley, New Guinea as part of developing an assault on Lae and Salamaua.[5] Six other engineer aviation battalions, including the 808th EAB, began building airfields in vicinity of New Britain Island and at Saidor on the New Guinea coast from December 1943 through January 1944. By the end of January 1944, MacArthur had 17 engineer aviation battalions and three airborne engineer aviation battalions, lighter version of heavy EABs, under his command.[6]

Four EABs under the 931st Engineer Aviation Regiment improved three inadequate Japanese airfields in the vicinity of Hollandia on 22 April 1944.[7] During this landing, engineers comprised 41 percent of the total task force strength--24,600 in all.[8] Engineers built airfields in rapid pace. In less than three weeks, the 836th EAB had an airfield operational. Aviation engineers also constructed an airfield ready for operation in less than two weeks on the small island of Owi, just south of Biak.[9] Later, Biak's airfield was improved for fighters and bombers. Engineer Aviation strength grew to 31 EABs, six airborne EABs, and two engineer aviation regimental headquarters by the summer of 1944.[10] By September 1944, all the airfields in New Guinea were operational.

By October 1944, General MacArthur had convinced President Roosevelt that the U.S. had to return to the Philippines for at least two reasons: morale and geographic strategic importance. The first step to take the Philippines was Leyte. This campaign alone required 21,097 engineer soldiers including 15 EABs, three construction battalions, two port construction repair groups and seven dump truck companies.[11] Units such as the 808th EAB, 821st EAB and the 1881st EAB not only fought and endured Japanese bombings during their mission at Tacloban, but they also fought the monsoon season.[12] Unfortunately, airfields could not be operational soon enough, thus reducing U.S. airpower and buying time for enemy reinforcements; the Japanese were able to add two divisions in the Ormac area. Allied forces endured the consequences of not having immediate land-based air support.

The next objective was Luzon in January through July 1945. Major General Hugh Casey, the Army Service Command (separate command for units supporting construction) Commander had nine EABs and Brigadier General Samuel Sturgis, the Sixth Army Engineer, had six EABs in Sixth Army.[13] EABs were pressured to construct airfields in as few as six days near the beachhead of Lingayen Gulf; the 1879th EAB built a 5,000-foot runway for fighters by 16 January 1945.[14] Opening this airfield provided a facility for ground-based aircraft, and it allowed aircraft carriers that provided air support to return to the Pacific fleet. Success at Luzon led to the capture of Manila and the Islands of Manila Bay from 27 February to 4 July 1945. Consequently, the Allied air offensive continued against Japan until 2 September 1945. Meanwhile, Japanese forces were destroyed in the Philippines, Borneo, Iwo Jima, and Okinawa. These examples illustrate engineer aviation unit contributions from December 1941 through September 1945.

Essentially, General MacArthur's strategy across the Southwest Pacific was to assault, consolidate, and assault again. To accomplish this, U.S. forces faced many challenges that required modification in multiple areas, particularly in supply and supply distribution. U.S. forces faced difficulties of covering 3,000 to 4,000 miles of ocean from Pearl Harbor to Tokyo (see figure 2) to maintain lengthy supply lines and to resource soldiers.[15] Engineer aviation units faced problems such as shortages in supply and equipment, construction materials, and transportation assets to distribute supplies. They also encountered initial transportation difficulties moving heavy equipment and supplies from ship to shore, which landing craft would later overcome.

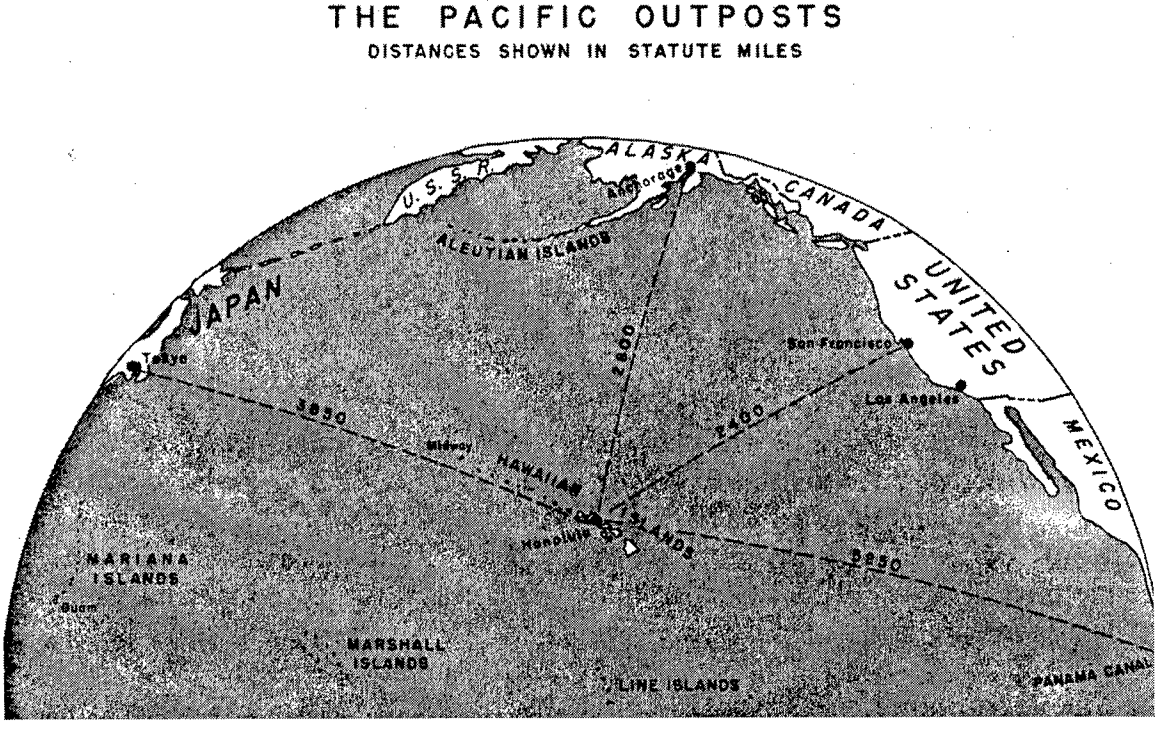

Figure 2. The Pacific Outposts
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 4.

Perhaps the next biggest difficulty for aviation engineers was overcoming the obstacles of terrain, weather, and disease. Most of the islands in the Southwest Pacific contained numerous swamps, rice paddies, and jungles that the engineers had to painstakingly clear or drain. Usually, terrain was mountainous inland with many caves that the enemy used for shelter and defensive positions. The weather was either hot or hot and humid with sometimes constant, heavy rain storms during the monsoon season. Finally, the terrain, weather, and those insects and animals that lived in the Southwest Pacific facilitated the spread of disease, often of unknown origin. These factors often contributed to the aviation engineers' challenge of completing airfields on schedule.

Time shortages to support MacArthur's timeline persisted. Aviation engineers mitigated these through new or modified techniques or procedures. They had to learn to load critical engineer equipment such as dozers and cranes last on ships, so they could be offloaded first to begin shore operations. Additionally, they deployed with prefabricated buildings and precut lumber. More dozers, dump trucks, and night lighting had to be added to the Table of Organization (T/O) for timely mission accomplishment. New construction standards evolved that changed airfield layout and design. Finally, engineer soldiers learned the advantages of using readily available construction materials such as coral and seawater since they could not always depend on the availability of other manufactured or natural construction materials; coral with its cementing properties was attained easily, contained a high load bearing capacity, and had water shedding surface qualities.[16] These related examples saved aviation engineers time in the Southwest Pacific Theater.

Utilities and facilities for servicing were also persistent issues. Everything required storage for protection against the climate and sea air: equipment, repair parts, fuel, food, water, and construction materials. Electric power and refrigeration greatly improved quality of life and working conditions.[17] Often, aviation engineers built numerous support facilities on bases to house these items.

One of the most formidable difficulties in facility construction was erecting the numerous pipeline systems as well as the requirement for gasoline and water storage tanks. To illustrate the massive amount of material needed, one B-29 bomber group required two million gallons of fuel a month.[18] Fresh water production was achieved through distillation. One gallon's worth of diesel energy was needed to make 20 gallons of water.[19] These were some of the logistical challenges and considerations that engineer aviation units had to overcome.

Engineer aviation forces were combat multipliers in the Southwest Pacific Theater and worldwide. Their numbers peaked in early 1945 to 120,000 officers and enlisted soldiers.[20] Each engineer aviation battalion contained 27 officers and 761 enlisted men.[21] 70 EABs would eventually serve in the Pacific Theater; however, control of these units was never defined either in training or while deployed. Control could come under the AAF (Army Air Force), the AGF (Army Ground Force), or the ASF (Army Service Force), and all, at one time or another provided, command and control of engineer aviation units from 1941 through 1945.

These accomplishments and issues are all related in the coming chapters. Despite tremendous growth in the number of engineers and their equipment during World War II, there were not enough resources as necessary to accomplish operational goals, not to

mention the difficulties in who would command and control these units. Therefore, these aviation engineers had to perform tasks beyond their original scope such as fighting as infantry, road building, or port construction. These challenges coerced aviation engineer units to change their tactics, techniques and procedures to keep pace with MacArthur's strategy.

A chronological approach is taken to relate the contributions of the aviation engineers as well as their significance to MacArthur's overarching strategy. Within each chapter, engineer aviation unit accomplishments are linked with tactical gains in land and air operations, as applicable, as well as illustrate engineer aviation unit successes, failures, and challenges in terms of mission, doctrine, organizational structure, and logistics. The thesis is that engineer aviation units enabled MacArthur's island hopping strategy, specifically through rapid airfield construction for fighters and medium bombers, to make tactical gains in the Southwest Pacific Theater starting in Australia in February 1942 through the Philippine offensives in June 1945. Their most significant airbase and airfield accomplishments were in support of General MacArthur's strategy throughout the Southwest Pacific: New Guinea, the Admiralties, Hollandia, Biak, Leyte, Luzon, Okinawa, and Iwo Jima.

The chapters that follow will examine these points in detail. Chapter 2 provides background of the engineer aviation unit from 1939-1941--origin, structure, and doctrine. In September 1939, the War Department directed the Corps of Engineers to plan for engineer construction units to support the Army Air Corps. Upon approval of the T/O, the 21st Engineer Aviation Regiment became the first in June 1940.[22] During 1941, twelve EABs were added to the overall Army's inventory, although only two EABs were

deployed in the Pacific Theater.[23] The EAB possessed more and heavier construction equipment than any other engineer battalion. The chapter ends with the attack on Pearl Harbor and the departure of engineer aviation forces from the U.S. to Australia in December 1941.

Chapter 3 begins with engineer aviation units' arrivals starting in Australia, February 1942, and it relates how the Allies and U.S. gained a foothold in the Southwest Pacific to begin the war against Japan. Additionally, it will discuss the fight in the Philippines, surrender of American and Philippines forces in May 1942, and the role that engineer aviation units played in the Philippines defense. Furthermore, engineers who participated in the Solomons and Papua New Guinea offensives are shown to illustrate how MacArthur brought the fight to the Japanese. This chapter ends with Allied momentum toward victory in New Guinea at the conclusion of 1942.

Chapter 4 prepares the reader for offensives to take place in 1944 and 1945. This chapter starts with Allied control of Guadalcanal by February 1943, and General MacArthur's preparations for invading the Philippines in 1944, using New Guinea as a base of operations. The first such step would be taking the islands east of New Guinea and various locations along the eastern New Guinea coastline in 1943 as well as holding all current ground to gain and maintain the momentum. This chapter ends with victories in Gusap and Finschhafen, New Guinea.

Chapter 5 opens with MacArthur's island assault plan starting with the Admiralties and Hollandia islands in early 1944. The Allies captured a key airfield on the Admiralty Islands north of Rabaul in late February. The Allies struck Hollandia with American bombers and fighters in April 1944, destroying 500 Japanese aircraft in hours

and capturing another key Japanese airbase.[24] With the Hollandia airbase, the Allies then struck the island of Biak, 225 miles to the northeast. The significance of this island was that it provided three airfields large enough to support the Fifteenth Air Force, and that it was the final Japanese stronghold prior to reaching the Philippines.[25] MacArthur secured this island ten weeks later and drove on to Leyte by October 1944. This chapter ends with the Allied planning for Leyte in October 1944.

Chapter 6 begins with MacArthur's charge toward Leyte in 1944 and the main island of Luzon in 1945. The significance of Luzon's capture is that it contained the Philippines capital, the city of Manila, as well as thousands of American and Filipino prisoners of war. Concurrently, by July 1945, the islands of Okinawa and Iwo Jima were captured, proving in August of 1945 to be vital airstrip locations to conduct offensives against the home islands of Japan. During this campaign, the fighter and bomber attacks against the Japanese islands intensified to destroy Japan's industrial base and to cut its supply lines. The chapter ends with the Japanese surrender on 2 September 1945.

The final chapter summarizes engineer aviation unit accomplishments that shaped air power and tactical land gains in the Southwest Pacific Theater to win the war against Japan. It also recognizes these units' accomplishments and challenges in organizational structure, logistics, command and control, and environmental conditions. This chapter emphasizes that engineers accomplished their mission in spite of these obstacles and set precedence for modern day airfield construction. The chapter concludes by linking the determination of aviation engineers during World War II with modern-day engineers.

There are a number of resources--secondary and primary--about engineer aviation units during World War II. Several secondary sources specifically discuss engineer

aviation unit organization from 1939-1945. Shelby Stanton lays the foundation with his book, *Order of Battle, U.S. Army, World War II.* This book gives the reader a comprehensive listing of all engineer units, including engineer aviation units, who were activated during World War II. The author also relates where they were activated, in which campaigns they participated, and their inactivation dates and locations. Sources that are particularly useful in understanding troop organization are: *The Corps of Engineers: Troops and Equipment* and *Engineers of the Southwest Pacific 1941-1945: Organizations, Troops and Training.* The former book devotes an entire chapter to discussing the activation, training, centralization, and equipment of engineer aviation units. The latter source relates organization, troops, and training starting with the Defense of the Philippines, 1941-1942 until the Occupation of Japan and Korea, September-December 1945.

Additionally, a publication that is quite helpful in understanding engineer aviation doctrine is *Engineers of the Southwest Pacific 1941-1945: Airfield and Base Development.* This source discusses airfield construction from 1941 in Australia through construction in 1945 in Japan. Next, *Engineers of the Southwest Pacific 1941-1945: Engineers in Theater Operations* sums up the general engineer accomplishments and scope of activities in the Southwest Pacific during World War II; it focuses on the missions and the units who performed them in each of the campaigns from the "Defense of the Philippines in 1941-1942" through "Engineers in Japan and Korea, August-December 1945." Furthermore, The Society of Military Engineers' journal, *Military Engineer*, and the War Department's *Aviation Engineer Notes* are useful in capturing lessons learned, challenges, and changes in doctrine and organization. For an Army Air

Corps or Air Force perspective, *Army Air Forces in World War II, Services around the World*, devotes an entire chapter to engineer aviation units who served in World War II with an overview of aviation engineers in the war with Japan.

Perhaps the best secondary source to examine particular units who participated in selected campaigns is *Builders and Fighters* published by the U.S. Army Corps of Engineers. Although not comprehensive, some chapters contain pertinent historical accounts relative to the thesis such as "Airfields for Heavy Bombers" in the Research and Development chapter as well as "Aviation and Amphibian Engineers in the Southwest Pacific" and "The Liberation of the Philippines" in the Combat Engineering: War in the Far East chapter. These sections give detailed accounts of those particular topics.

Unit histories of engineer aviation units provide an excellent first-hand account of unit accomplishments and the soldiers who made it possible. A brief history of Company A, 803d Engineer Aviation Battalion recounts how the unit heroically defended the west coast of Baatan, Island of Luzon in the Philippines, January 1942. Additionally, the history of the 860th Engineer Aviation Battalion depicts the unit from its activation in California in January 1943 to its follow-on journeys to Australia, New Guinea, Biak Island, Owi Island, Leyte Island, Manila, and Yokohama, Japan. Three more unit histories also relate engineer aviation units that served in the Pacific Theater: the 805th Engineer Aviation Battalion, the 864th Engineer Aviation Battalion, and the 876th Engineer Aviation Battalion. These unit histories also recount their activation in the U.S. as well as their campaign participation in New Guinea, the Philippines, and Japan. Finally, there are also Engineer Field Manuals, such as FM 5-5 and FM 5-6, Operations of Engineer Field Units and Engineer Troops, respectively, that the War Department

published in 1943 and 1944 that show engineer aviation organization, mission, and equipment during World War II.

These primary and secondary sources are instrumental in discussing the next six chapters. First, I will review the background of the engineer aviation unit--structure, organization, mission, and equipment--prior to discussing factors that led to successes, failures, or improvements as well as command and control issues within each campaign for the aviation engineers. A snapshot of the engineer aviation unit and its evolutions prior to the start of World War II in the Southwest Pacific, 1939 through 1941, will give a solid foundation for the campaigns from 1942 to 1945. Upon completion, the reader will have a firm foundation of aviation engineer structure and how these units with their personnel and equipment helped to achieve MacArthur's strategy.

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[1]Barry W. Fowle, ed., *Builders and Fighters: U.S. Army Engineers in World War II* (Fort Belvior: Office of History, 1992), 351.

[2]Eric M. Bergerund, *Fire in the Sky: The Air War in the South Pacific* (Oxford: Westview Press, 2000), 5.

[3]Fowle, 352.

[4]Ibid., 353.

[5]Ibid., 357-358.

[6]Ibid., 360.

[7]Ibid., 361.

[8]Ibid., 364.

[9] Ibid., 362.

[10]Ibid., 364.

[11]Ibid., 380.

[12]Ibid., 383.

[13]Ibid., 386.

[14]Ibid., 387.

[15]George E. White Jr., "From Pearl Harbor to Toyko," *The Military Engineer* 38, no. 243 (January 1946): 1.

[16]White, 2-5.

[17]Ibid., 7-8.

[18]Ibid., 8.

[19]Ibid.

[20]Fowle, 351.

[21]Ibid.

[22]Blanche D. Coll, Jean E. Keith and Herbert H. Rosenthal, *The United States Army in World War II, the Technical Services, the Corps of Engineers: Troops and Equipment* (Washington, D.C.: Office of Chief of Military History, 1958), 129.

[23]Fowle, 352.

[24]Ibid., 360-361.

[25]Ibid., 382-384.

CHAPTER 2

FORMATION OF ENGINEER AVIATION UNITS, 1939-1941

The idea of aviation engineers entering the Army's force structure first emerged in 1939. The concept grew out of the Chief of Army Air Forces' request through the War Department to organize soldiers specifically trained with construction skills to repair, camouflage, and defend airfields. Since World War I, the Quartermaster Corps had been responsible for military construction to include barracks, buildings, and airfield construction.[1] Louis Johnson, the Assistant Secretary of War, and Brigadier General George Marshall, Army Deputy Chief of Staff, were concerned that the Quartermaster Corps would not be able to handle the entire scope of military facilities development with the military's hasty enlargement. They spearheaded the idea of allowing the Corps of Engineers to take responsibility of airfield construction.[2]

Colonel Stuart C. Godfrey, Engineer for the Army Air Forces Combat Command, stated that the Air Force had three requirements: "combat planes, flying personnel, and air bases from which to operate."[3] The requirement for engineer aviation units to build airbases evolved out of a necessity. The U.S. Army was undergoing phenomenal change and expansion due to Congress's Reorganization Act passed in April 1939 in response to President Roosevelt's appropriation requests.[4] The Corps of Engineers alone expanded over 1000 percent from July 1939 through July 1941--twice the rate of expansion of the Army as a whole.[5] At the time, air power was also rapidly growing--more than the Corps of Engineers--with President Roosevelt calling for the production of 50,000 planes a year after the German invasion of France in 1940, 25 times the 1940 rate of production.[6]

Germany's invasion of Poland in September 1939 hastened the change of responsibility for airfield construction. The War Department asked Major General Julian Schley, the Chief of Engineers, to develop plans for engineer units capable of building airfields.[7] The Table of Organization (T/O) proposal from Brigadier General John Kingman, Assistant Chief of Engineers, Military Division, led to the first prototype engineer aviation regiment.[8] In June 1940, the Corps of Engineers redesignated the 21st General Engineering Regiment as the 21st Engineer Aviation Regiment under the command and control of the Air Force Combat Command. This regiment was composed of three battalions with a peacetime strength of 43 officers and 1,050 enlisted men as well as basic construction machinery.[9] The organization, soldiers, and equipment of the regiment's subordinate battalions and separate engineer aviation battalions, or EABs, were the most common aviation unit. These independent EABs built airfields rapidly and contained more and heavier construction equipment than any other engineer battalion in the Corps of Engineers.[10]

Prior to December 1941, the engineer aviation regiment's function and tasks were subjected to practical tests connected to technological and equipment development. With both greater aircraft speeds and weights, the simple former grass strips of World War I were no longer adequate. Aircraft of the late Interwar Period required cleared areas, extensive runways, and all-weather use. Waiting one to two years for a completed, permanent airbase was no longer feasible for a theater of operations in 1940. A different type of airfield construction was envisioned, which included emergency expansion of existing air bases with smaller and better-concealed auxiliary airfields or the constructing of a new airfield in a distant theater. In December 1941, Major General Henry H. Arnold,

the Chief of the Army Air Forces, asserted that the function of an aviation engineer unit in the operational theater was "the creation or improvement of landing and takeoff areas, with shelter for personnel, airplanes and supplies, the provision for local anti-aircraft security while on construction tasks, and assistance in active defense of air installations against ground or air attack."[11] Essentially, these engineers were trained in constructing, concealing, maintaining, and defending military airdromes.[12] Colonel Stuart C. Godfrey, Engineer, Army Air Force, outlined some specific tasks in "Engineers with the Army Air Forces" in *Military Engineer*:

1) Improvement or provision of advanced airdromes, to include runways, landing strips, shelters, airplane parking areas, internal routes of communication, water supply, lighting and other utilities.
2) Improvement or provision of routes of communication to such airdromes.
3) Provisions for gas-proofing and bomb-proofing essential parts of such installations.
4) Camouflage of advanced airdromes and other Air Force installations.
5) Assistance in the anti-mechanized defense of advanced airdromes by construction and defense of roadblocks, and by combat against raids delivered by ground forces.
6) Assistance in the defense of advanced airdromes against air attack.
7) Maintenance and repair of airdromes, especially after damage by enemy bombers. [13]

To perform these engineer aviation specific tasks, the regiment and its battalions required specially trained soldiers and specific equipment.

After numerous iterations between June 1940 and January 1941, the engineer aviation regiment evolved into 66 officers, one warrant officer, and 2165 enlisted men.[14] The regiment was organically assigned to the GHQ Air Force (later Air Force Combat Command) and operated under the engineer section of that or other Air Task Force headquarters with the primary mission of assisting in providing airbases and advanced airdromes (refer to figure 3 for the engineer aviation regiment's overall structure).[15]

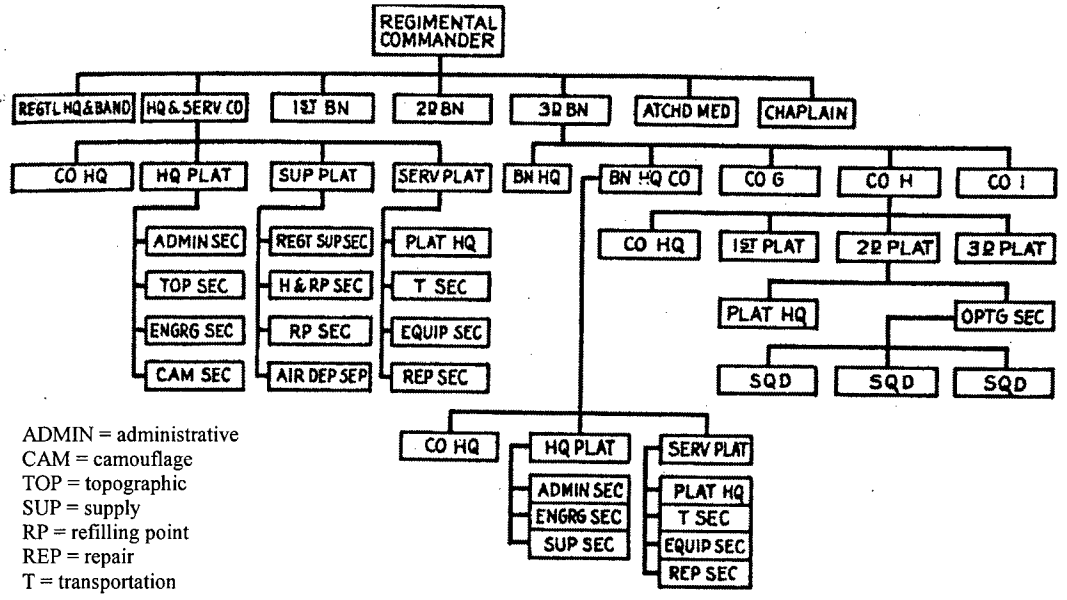


Figure 3. Engineer Aviation Regiment
Source: Colby M. Myers, "An Analysis of the New Organization of General Engineer Units," *The Military Engineer* 33, no. 187 (January-February, 1941): 25.

In January 1941, the robust engineer aviation regiment consisted of the regimental headquarters, headquarters and service company, and three battalions. A colonel commanded the regiment with a lieutenant colonel as his executive officer. Three captains served as the officers in charge of the administrative and engineering sections of the headquarters platoon and the regimental supply section of the supply platoon, respectively. Two first lieutenants took charge of the topographic and camouflage sections of the headquarters platoon. [16]

The regiment's headquarters and service company had some unique capabilities when compared to other headquarters and service companies of other engineer units. The first was that it possessed a topographic section in the headquarters platoon and separate sections for transportation and equipment in the service platoon.[17] The second distinctive

aspect was that its supply issues were handled by a separate supply platoon instead of just a supply section. The sections of the supply platoon included the Air Force Engineer Depot Section, the Air Depot Section, and the Refilling Point Section. The Air Force Engineer Depot Section with nine enlisted members was responsible for supplying, storing, and distributing class IV engineer supplies, including camouflage and construction materials.[18] The Air Depot Section with six enlisted members provided engineer items with the exception of class IV and camouflage.[19] The Refilling Point Section with 18 enlisted men gave camouflage instruction and inspections services and operated the supply point or points for camouflage materials and sandbags for all air units in the service area.[20] Equipment quantities found in the company were the following:[21]

Clearing unit	1	Emulsion distributor	1
Road material mixer	1	Heavy disk plows	2
Rubber-tired roller	1	Sheep's foot roller	1
Roller, 5-ton	1	Roller, 10-ton	1
Scrapers, 12 yd	3	Power shovel, ¾ yard	1
Tractors, 95-hp	3	Portable storage tank, 1000 gal	1
Tractor, rubber tired	1	Vertical boom trencher	1
Map reproduction trailer	1	Copying camera trailer	1
Various trailers (8 and 21-ton)		Various heavy trucks	

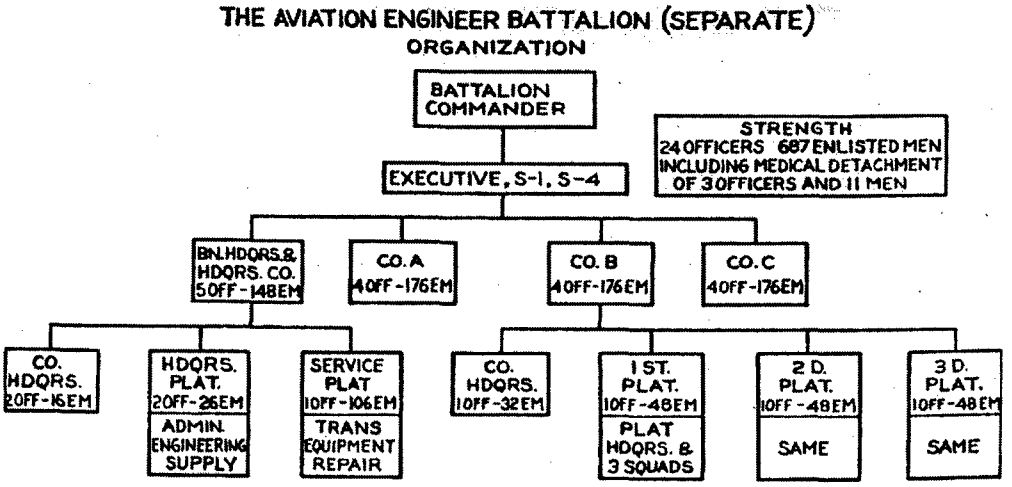
Furthermore, the regiment consisted of three battalions. Each battalion contained a battalion headquarters company as well as three line companies. The battalion headquarters was composed of a lieutenant colonel as the battalion commander and two captains as the adjutant and engineering officers. The company commander of the battalion headquarters company was also the battalion S4, or supply officer.[22]

The battalion headquarters company included three officers and 109 enlisted soldiers.[23] Equipment found in the company included the following with quantities listed:[24]

Electric lighting set	1	Tractor crane, 30ft boom	1
Electric arc & welding set	1	Medium tractors with bulldozers	2
Leaning wheel grader	1	Water purification unit	1
Motorized road grader	3	Scraper, 8 yd	3
Heavy rooter	1	Shovel, 1 ½ yd	1
Medium rooter	1	Tractors, 70-hp	3
Sheep's foot roller	1	Various heavy trucks/trailers (8 and 15-ton)	

Three line company commanders served with the battalion headquarters company commander. Each company had a company headquarters platoon and three platoons. Each of the three platoons in the line companies contained one officer and 48 enlisted men.[25] Overall, the company had four officers and 176 enlisted soldiers.[26] Its specialized equipment included the heavy disk plow, a tractor plow, and a 500-gallon portable storage tank. Notably, platoons through the engineer aviation regimental level did not have machine guns in January 1941 even though the defense of an airfield was listed as a task.[27]

Nevertheless, the engineer aviation regiment, particularly the 21st Engineer Aviation Regiment, was only the parent unit of engineer aviation units to come. As of December 1941, twelve new engineer aviation battalions (separate) were hurriedly activated and trained.[28] As of October 1941, these battalions, growing to 24 officers and 687 enlisted men, were designed to perform independently and build airfields rapidly.[29] They contained more and heavier equipment than any other engineer battalion, and they were designed to work in two to three shifts, facilitating 24-hour operations.[30] By this time, the engineer aviation regiment's strength grew to 79 officers and warrant officers and 2,207 enlisted men (figure 4 summarizes the engineer aviation battalion (separate) structure, personnel, and equipment).[31]



HEAVY EQUIPMENT

ARMAMENT		PUSH W/D-4 TRACTOR	3
MACHINE GUN	21	TANK, 750 GALLON, W/SKIDS	1
PISTOL	193	TRACTOR	
RIFLE	504	DIESEL, D-4, W/DOZER	3
CAR, SEDAN	1	" , " , " " & TRAILER	3
COMPRESSOR, AIR MOTORIZED	4	" , D-7, " "	3
DISK, HARROW	1	" , D-8, " "	1
DISTRIBUTOR, ASPHALT, MOTORIZED	1	GASOLINE, RUBBER TIRED	1
GENERATOR, ELECTRIC, 5 KVA, W/SKIDS	1	TRAILER	
GRADER, ROAD		1 TON	18
LEANING WHEEL, TOWED	1	8 TON	6
MOTORIZED, DIESEL	6	15 TON	5
MIXER		20 TON	1
CONCRETE, 14 CU.FT., TOWED	3	250 GALLON TANK, WATER	7
ROAD MATERIAL	1	TRENCHER, VERTICAL BOOM	1
MOTORCYCLE, SOLO	11	TRUCK	
PLOW		AMBULANCE	1
DISC, HEAVY	3	¼ TON, G.P.	4
TRACTOR	3	½ " , COMMAND	6
PUMP		½ " , PICKUP	12
CENTRIFUGAL	2	½ " , RADIO	1
DIAPHRAGM	1	1-½ " , CARGO	1
REPAIR, UNIT, MOBILE	1	1-½ " , DUMP	62
ROLLER		2-½ " , CARGO	2
RUBBER TIRED, MOTORIZED	1	4 " , CARGO	3
SHEEPSFOOT, TRIPLE	1	4-5 " , DUMP	10
TANDEM, 10-TON, MOTORIZED	2	6 " , CARGO	7
ROOTER, MEDIUM	1	WATER SUPPLY EQUIPMENT, PORTABLE	1
SCRAPER, CARRYALL		WELDING SET	
3½ CU. YD.	3	ELECTRIC, MOTORIZED	1
8 CU. YD.	3	OXYACETYLENE, PORTABLE	1
SHOVEL		WELL DRILLING SET, MOTORIZED	1
GASOLINE, ½ CU. YD.	3		

Figure 4. Engineer Aviation Battalion (Separate)
Source: Stuart C. Godfrey, "Engineers with the Army Air Forces," *The Military Engineer* 33, no. 193 (November, 1941): 488.

This battalion organization of October 1941 differed significantly in equipment numbers from the battalion organic to the engineer aviation regiment of January 1941. First of all, the separate battalion contained 21 machine guns, which were vital to the

airdrome or airbase defense, as opposed to none in the previous organization. Additionally, the amount of heavy equipment increased from three to six motorized road graders, zero to three 3-1/2 cubic yard scrapers, two additional ½ cubic yard gasoline shovels, and nine more bulldozers ranging from D4 to D8 models. This increase in bulldozers benefited units while clearing the Southwest Pacific jungles starting in 1942, while the varying models created challenges in obtaining parts. By December 1941, the only significant change to this heavy equipment was an increase in D7 bulldozers from three each to six each.[32] These increases in numbers reflected the idea that a separate engineer aviation battalion was expected to complete the construction of one airfield in a maximum of six weeks under favorable conditions.[33] In summary, the separate engineer aviation battalion had no fewer than 220 pieces of heavy equipment and 146 vehicles at the end of 1941.[34]

Slight increases in heavy equipment and personnel continued as World War II progressed and as engineers learned that the increased number of missions, the lack of time, and the Southwest Pacific Theater weather and terrain presented further challenges. By May 1944, the aviation engineer battalion T/O expanded to 33 officers and 774 enlisted soldiers. Additionally, the motorized grader number aggregate grew from six to eight each in the battalion. The diesel tractor dozer increased from 10 to 11 each and the gasoline tractor increased from one to two each in the engineer aviation battalion. Larger 2 ½-ton dump trucks replaced smaller 1 ½-ton dump trucks. Weapons, such as the .45-caliber machine gun increased from 21 to 27 each. Six .50-caliber machine guns and eight 60-millimeter mortars were also added to the T/O for airbase defense.[35] These were

some examples of how the T/O changed in May 1944 to meet the challenges of the Pacific Theater.

The Louisiana Maneuvers, a training exercise in the fall of 1941, contributed most to T/O improvements prior to U.S. entry into the war and to instilling confidence in the engineer aviation units. This was the first exercise that allowed the engineer aviation units (the 21st Aviation Regiment from Langley Field, Virginia, and one company from the 810th Engineer Battalion from MacDill Field, Florida) to work directly with the Army Air Force.[36] Both of these units arrived at the training site three weeks prior to actual maneuvers with a primary task of "improving and maintaining landing fields" and a secondary task of "executing work for the concealment of airdromes, shelter for planes, and personnel, and defensive works to protect against air and ground attack" according to the *Engineer Annex* issued by the Air Force Combat Command.[37] Although Colonel Godfrey praised the engineer aviation performance, observing that the "work done was precisely what would have been required," he had some false expectations regarding the role and capability of aviation engineers.[38]

Specifically, he expressed these presumptions in *Military Engineer*'s "Engineers with Army Air Forces" in 1941, while relating aviation engineer unit accomplishments during the Louisiana Maneuvers. Like most staff planners prior to World War II, he had preconceived notions of the aviation engineer unit's specialized role and had expected that the conditions that they would work in would typify the European Theater of World War I rather that the Southwest Pacific Theater of World War II. Specifically, the first error was Colonel Godfrey's predetermined view that aviation engineers would primarily work on advanced airdromes where speed was essential.[39] True, engineer aviation units

were expected to build airdromes quickly--the standard was six weeks in the fall of 1941 under ideal conditions. However, the next four years would show that aviation engineers were required to build airdromes from the raw jungles (not always from pre-existing airdromes) of the Southwest Pacific even faster--in as little time as three weeks or just days, for example. Additionally, engineers, in general, were always in shortage, and the idea that the aviation engineers would primarily work on airstrips was flawed. These engineers would later have their mission expanded to building roads, ports, and bridges as well as fighting as infantry.

The second flaw in Colonel Godfrey's argument was that he presumed success when no opposing force existed against the aviation engineers while they performed their mission. The units worked with the Army Air Force prior to the start of the ground maneuver forces' arrival under administrative conditions, meaning that the units were not faced with the test of an opposing force from the ground or from the air. Not only were the units not faced with completing their mission under fire from an enemy, but they also did not have the challenges of sweltering heat, disease, monsoon rains, lack of supplies, and hilly, thickly vegetated terrain of the Southwest Pacific Theater. Leaders also did not confront moving heavy engineer equipment from ship to shore and from the beachhead to the construction site. Essentially, Colonel Godfrey and Major General Henry Arnold expressed a European Theater perspective when considering the role, function, tasks, and capabilities of engineer aviation units. Just a month prior to the Japanese attack on Pearl Harbor when their articles were written, the Southwest Pacific Theater with its challenges was not in the forefront of their thoughts.

At the time of the 7 December 1941 attack on Pearl Harbor, only two aviation engineer units existed in the Pacific Theater: the 804th Engineer Aviation Battalion (EAB) on Oahu, Hawaii and the 803d EAB in the Philippines.[40] The first American engineer reinforcements, the 808th EAB left for Australia from the United States in late December 1941.[41] Thus, the crucial role that the engineer aviation units played in support of tactical advances through airfield construction for fighters and bombers began in support of General MacArthur's island hopping strategy for the Southwest Pacific.

Clearly, the importance of air power had emerged prior to the start of World War II. Major General Arnold believed, "Fighters can prevent the *loss* of a war, but the heavy bombers are required to *win* it."[42] The newly created aviation engineer unit, with its skilled personnel and specialized equipment, projected that power throughout the Southwest Pacific at the tactical, operational, and strategic levels.

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[1]Barry W. Fowle, ed., *Builders and Fighters: U.S. Army Engineers in World War II* (Fort Belvoir: Office of History, 1992), 18.

[2]Ibid., 18.

[3]Stuart C. Godfrey, "Engineers with the Army Air Forces," *The Military Engineer* 33, no. 193 (November, 1941): 487.

[4]Fowle, 19.

[5]Julian L. Schley, "Military Engineers Today," *The Military Engineer* 33, no. 190 (July-August, 1941): 270.

[6]Henry H. Arnold, "The Air Forces and Military Engineers," *The Military Engineer* 33, no. 194 (December 1941): 545.

[7]Fowle., 19.

[8]Blanche D. Coll, Keith, Jean E. Keith and Herbert H. Rosenthal, *The United States Army in World War II, the Technical Services, the Corps of Engineers: Troops and Equipment* (Washington, D.C.: Office of Chief of Military History, 1958), 18.

[9]Fowle, 20.

[10]Ibid., 351.

[11]Arnold, 548.

[12]Godfrey, 487.

[13]Ibid., 488.

[14]Colby M. Myers, "An Analysis of the New Organization of General Engineer Units," *The Military Engineer* 33, no. 187 (January-February, 1941): 25.

[15]Ibid., 25.

[16]Ibid.

[17]Ibid.

[18]Ibid.

[19]Ibid.

[20]Ibid.

[21]Ibid.

[22]Ibid.

[23]Ibid.

[24]Ibid.

[25]Ibid., 21.

[26]Ibid., 22.

[27]Ibid., 25.

[28]Fowle, 351.

[29]Myers, 25.

[30]Ibid., 25.

[31]Godfrey, 488.

[32]George E. White Jr., "From Pearl Harbor to Toyko," *The Military Engineer* 38, no. 243 (January 1946): 5.

[33]Godfrey, 489.

[34]Ibid., 489.

[35]*Table of Organization and Equipment, No. 5-415, Engineer Aviation Battalion,* (Washington, D.C.: War Department, 15 May 1944).

[36]Godfrey, 491.

[37]Ibid.

[38]Ibid.

[39]Ibid., 489.

[40]Fowle, 352.

[41]Ibid., 353.

[42]Arnold, 547.

CHAPTER 3

DEFENSE OF THE PHILIPPINES AND PREPARATIONS FOR THE OFFENSE, 1942

During the first year of World War II in the Southwest Pacific Theater three major events occurred: the defense of the Philippines, the buildup in the Southwest Pacific Area (SWPA), and preparations for the Allies' first offensives in Papua New Guinea and the Solomons. Engineer aviation units played important roles in all three of these events to support MacArthur's strategy. They confronted command and control and logistical support issues while making significant contributions in shaping and sustaining the Allied defense of Australia and the initial offensives into New Guinea. The Allies' defeat in the Philippines in early 1942 made Australia the last defensive stronghold in the Pacific from which the U.S. and Australian forces could build bases and launch air and amphibious attacks against neighboring Japanese occupied territories. Aviation engineers shaped and sustained tactical gains by rapidly building airfields from Australia to New Guinea that resulted in a strong Allied foothold in the region by 1943.

Prior to the start of the war, U.S. strategy in the Philippines was in accordance with War Plan Orange-3 (WPO-3), which called for American and Filipino forces to withdraw to the Bataan Peninsula if they could not defeat a Japanese invasion, to make a six-month stand, and to deny enemy access to Manila Bay.[1] General Douglas MacArthur, the former U.S. Army Chief of Staff, had been a military advisor to the Philippine government since 1935, and he proposed to President Roosevelt, after his appointment as head of the United States Army Forces in the Far East (USAFFE) in July 1941, that a new war plan be written to replace WPO-3.[2] MacArthur not only believed that the

American and Filipino forces could hold off a Japanese invasion for six months, but he also thought that these forces could halt any Japanese expansion to the south of the Philippines.[3] Instrumental to this new proposal was the introduction of the B-17 bomber, which could effectively be used against Japanese possessions from the Philippines. Upon Army Chief of Staff General George C. Marshall's approval of this plan in November 1941, MacArthur began to refine his new strategy. Unfortunately for the Allies, outbreak of war on 7 December at Pearl Harbor and the Japanese attack on the Philippines on 8 December changed his plans to a more defensive posture.[4]

Even prior to the Japanese attack, Colonel Henry Stickney, the Philippine Department Engineer, and his replacement, Lieutenant Colonel Hugh Casey, the USAFFE Engineer, realized that the defense of the Philippines would require exhaustive engineer work. In 1940 and early 1941, there were only two airfields in all the islands: Nichols Field just south of Manila and Clark Field which was about 50 miles northwest of Manila (see figure 5).[5] Nichols Field had a paved runway, but it was too small to accommodate B-17 bombers. Consequently, the 809th Engineer Aviation Company (Separate) was assigned to Nichols Field upon arrival in July 1941; the 176 assigned men and 800 unskilled native laborers worked arduously on the airfield construction program.[6]

To augment the 809th's efforts, the 803d Engineer Aviation Battalion (EAB) arrived on 23 October 1941. The headquarters company extended turf runways at Clark for B-17s. Company A took over the airfield construction projects at the O'Donnell-Capas-Tarlac area, and Company B went to the Sugar Central Area of Del Carmen, near the base of the Bataan Peninsula, where it commenced building an airdrome on 10

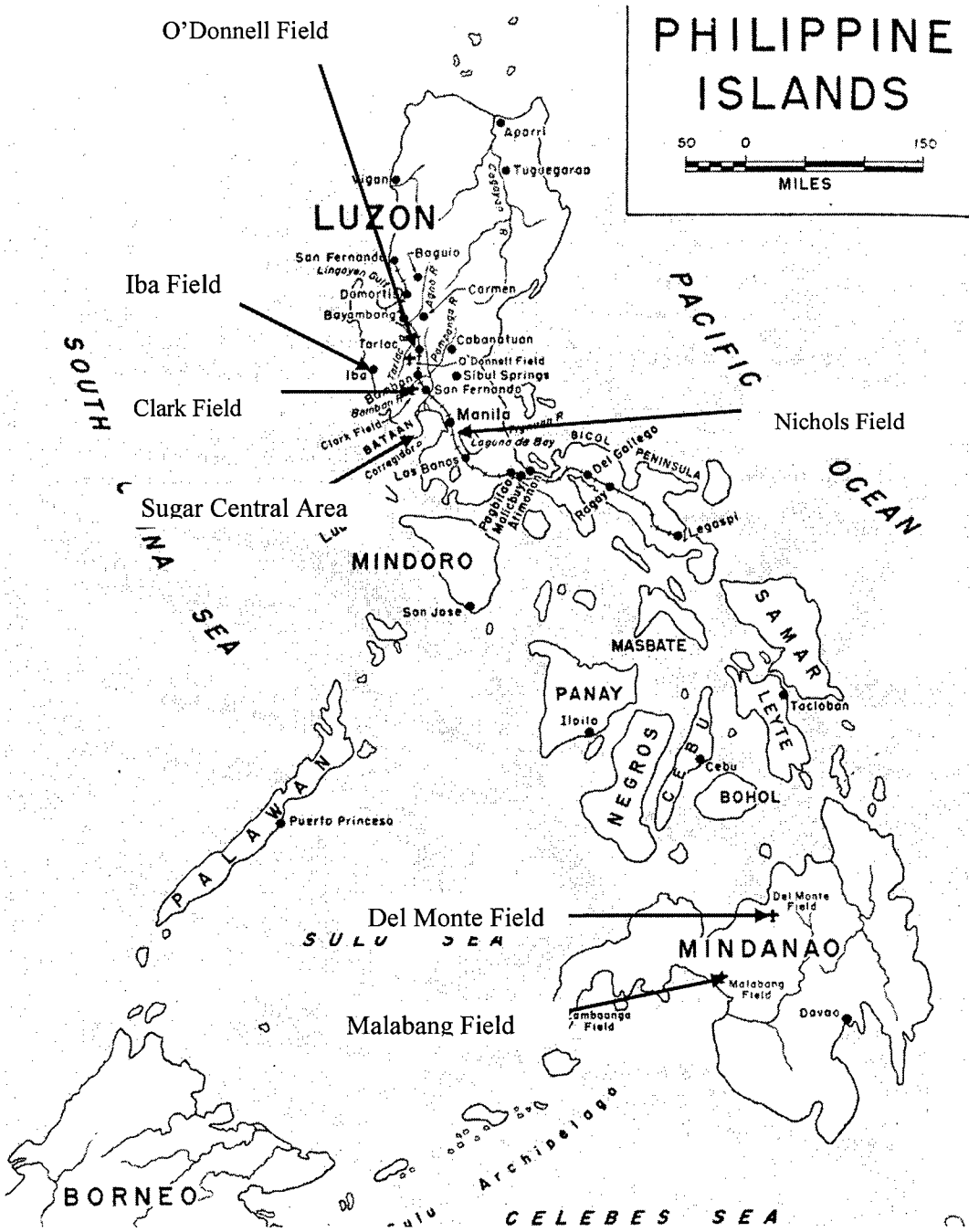

Figure 5. Philippine Islands

Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 56.

November.[7] On 1 December, the 809th became Company C, 803d EAB, and the unit remained at Nichols Field to maintain the airdrome. Other airfields in Del Monte and Malabang were constructed and were in use by late 1941.[8]

Engineer units were vital to creating or bolstering airfield capabilities and could not keep up with airfield construction demands. Unfortunately, the 803d EAB, along with the 14th Combat Engineer Battalion (Philippine Scouts), were the only engineer forces in the Philippines and were comprised of 1,500 men, or less than five percent of the U.S. force.[9] Colonel Francis M. Brady of the Far East Air Force (FEAF) wrote, "Construction of airdromes is lagging due to lack of engineer personnel and inability to secure competent civilian assistance from among Filipinos or local contractors. The dearth of equipment is also a serious factor."[10] Major General Lewis H. Brereton, commander of FEAF, concurred and called the construction progress "disappointing."[11] Aviation engineers faced more construction challenges in the coming days.

At 12:30 p.m. on 8 December, 54 Japanese two-engine bombers attacked Clark and Iba Fields, followed by Japanese fighter planes that nearly destroyed all of the air power of the Far East Air Force within a few days.[12] Only a few of USAFFE's pursuit planes and B-17 bombers remained after the raids on 11 and 12 December. Those few B-17s that survived were flown to Australia.[13] Under Colonel Stickney's direction, the 803d continued to repair the bomb-damaged airfields at Clark and Nichols, and they sped up their construction efforts to complete Del Carmen and O'Donnell Fields. General MacArthur ordered Stickney on 18 December to prepare for "large reinforcements of airplanes" that were expected from the United States.[14] Although these hasty construction

efforts later proved futile since these reinforcements never arrived, the 803d built a number of airfields during its withdrawal to Bataan (see figure 6.).

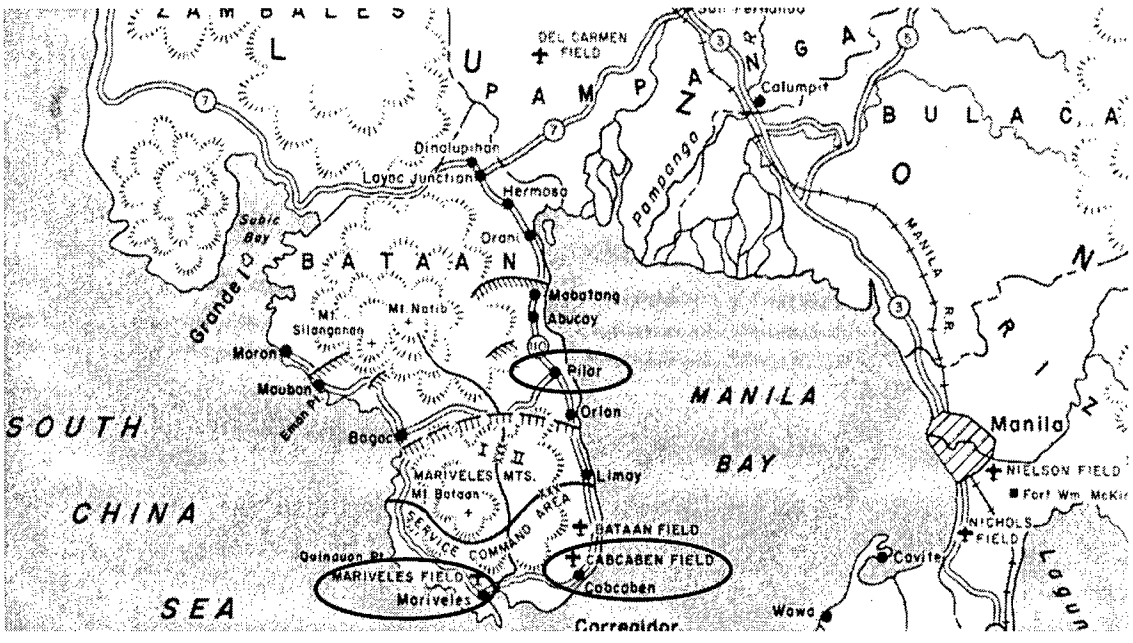

Figure 6. Bataan Peninsula 1942
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 86.

In the first month after the initial attack, the 803d not only made considerable progress in airfield construction, but also repaired and improved roads and defensive positions as it withdrew to the Bataan Peninsula. On 21 December, Company A was ordered to abandon O'Donnell for Dinalupihan, near the Bataan Peninsula base where soldiers built three airstrips in three days and then began work on revetments or "plane pens."[15] On Christmas Day, Headquarters Company departed Clark to join Company A[16], and on 29 December both companies moved south to Orani to make another airstrip

there.[17] Headquarters Company was responsible for maintaining 30 kilometers of road and bridges in the vicinity of Mariveles as well as hauling 8-inch guns to the Bataan Peninsula.[18] Company A also began work on widening the one-lane dirt road on the west side of Bataan, the only supply road for the west coast sector.[19]

Meanwhile, after Company B finished the strip at Del Carmen, the unit withdrew to Hermosa and Pilar to build bomber airstrips on Bataan's eastern coast.[20] Since Pilar was so close to the front lines, work was only done at night. Additionally, the unit surveyed locations for the large artillery guns and moved some 8-inch guns and parts.[21] From Pilar, the company was sent to the southern tip of Bataan to work on Mariveles Field and a section of road.

Company C left Nichols Field and pushed on to the tip of Bataan and Cabcaben Field.[22] Although the engineers provided the airstrips, few planes used them, and the enemy captured most of the airstrips. Early in the Japanese siege, there were only three airstrips--Bataan, Mariveles, and Cabcaben--left to be lengthened, widened, and maintained; only one airplane existed at each airfield, respectively, and no more would come.[23] Captain Samuel A. Goldblith, who published the unit's history in *Military Engineer* in August 1946 wrote, "In Bataan, the company extended the runways at two fields, and constructed camouflaged plane pens--for the planes that never came."[24]

The 803d EAB heroically repulsed numerous Japanese advances and endured multiple enemy bombing attacks. One such particular example was Company A's defense of Quinauan Point, also known as the Battle of Agoloma. By mid-January, Company A started work on the west road and gun emplacements along the coast.[25] On 23 January, the Japanese made a surprise landing at Quinauan Point and worked their way to within

100 yards of the coastal road.[26] Since the company bivouacked in that same area, it was sent to help repulse the enemy. Of the 90 engineers from the unit sent to take part in the jungle warfare, nine were killed and 38 were wounded.[27] According to the memoirs of Captain Robert Montgomery in 1946, at the time of the battle a lieutenant in Company A, "no other West Coast invasion attempts were ever made after the Quinauan Point was cleaned up."[28] On 4 February, the company was moved to recuperate from battle and to repair Kindley Field, a small airstrip on Corregidor, or "The Rock," a small island just south of the Bataan Peninsula.[29] They were bombed there almost daily after their arrival. By 28 April, they endured their 100th bombing and 49 more bombings in the next three days until General Wainwright surrendered Corregidor on 6 May 1942.[30]

In all, according to Captain Samuel Goldblith, the battalion built over 12 airstrips on Luzon in efforts in defense of the Philippines despite dwindling supplies and diseases resulting from malnutrition, malaria, and dysentery.[31] Its personnel and equipment also moved heavy guns across the Bataan peninsula, repaired bridges and roads, and even transported, set up, and maintained four rice mills.[32] Goldblith concluded, "the Battalion ended up as an infantry battalion to be the last unit to leave the front lines on the Eastern sector."[33] In spite of these difficulties, the 803d heroically performed as engineers and as infantry soldiers.

While the soldiers in the Philippine defense endured five months of Japanese attacks, forces continued to build up in the Southwest Pacific throughout 1942 in preparation for the Allies' first offensives in the Solomons and Papua New Guinea. The first U.S. troops, approximately 4,600 soldiers, arrived at Brisbane, Australia on 22 December 1941.[34] General George Marshall, the Army Chief of Staff, initially appointed

Major General George H. Brett, chief of the Air Corps, to take command of United States Army Forces in Australia (USAFIA), giving him two major tasks: to get supplies to the Philippines and to transform Australia into a major airbase (see figure 7).[35] Brett mandated airbase construction at Darwin, Brisbane, and Townsville.[36]

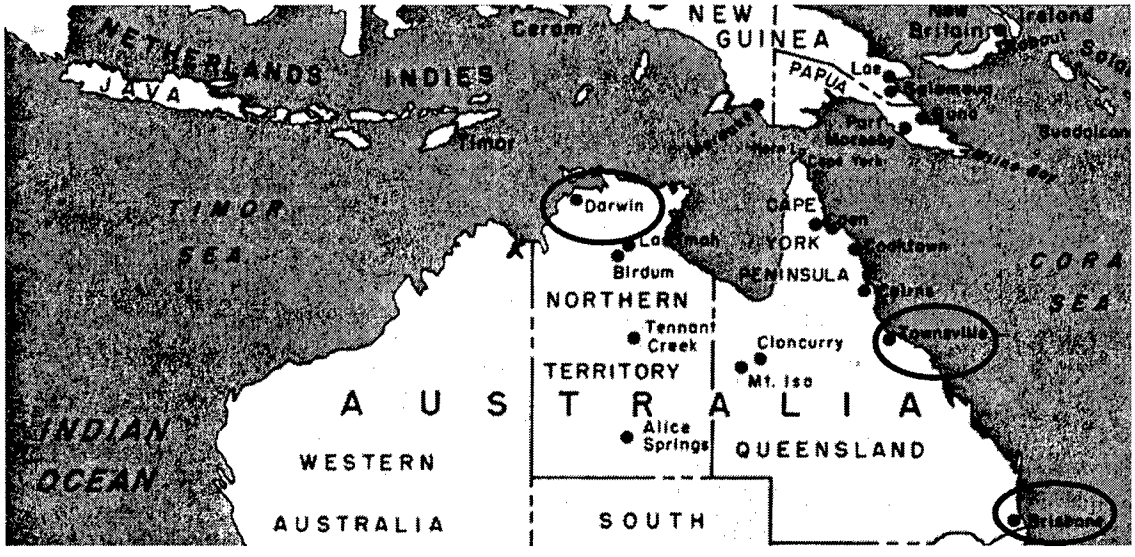

Figure 7. Northern Australia 1942
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers: The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 108.

To start construction at these and other locations in Australia, the 808th EAB, just activated in September 1941 in the United States, arrived in Melbourne on 2 February 1942. Unfortunately, the unit arrived without its heavy equipment with the exception of three dump trucks and two tractors. The unit was halted at Katherine enroute to Darwin since the latter town was enduring Japanese bombardment.[37] Nevertheless, the unit received orders from Brett to convert a civil airdrome into a medium bomber field at Katherine in the Northern Territory and scout for more fields in the area.[38] By 6 March,

slightly discouraged about his unit's progress, Captain Andrew Chaffin, Jr. stated, "Little . . . has been done towards building airfields in this vicinity because of the complete absence of equipment."[39] Even with the addition of 11 cargo trucks and two old bulldozers he acquired at Darwin, work was slow, especially since seven of 14 total trucks were used daily just to supply the unit with food and water.[40] Australia had neither the equipment nor the industrial base to produce engineer machinery or engineer supplies, and the Australian Commonwealth asked for as much equipment as the United States could supply.[41] On 26 February, the 43d General Engineer Regiment arrived in Melbourne, and one of its battalions joined the 808th in the Northern Territory to provide more manual labor. Ships with "distress cargo" that were fleeing the Japanese advance through Malaya and the Indies arrived in the ports of Australia, since these shiploads of equipment and caterpillar tractors parts provided necessary machinery and kept existing machines running.[42] These American and Dutch ships proved to be a "windfall" and provided the engineers with more equipment than any other source.[43]

Formal division of the Pacific Ocean Area (POA) did not take place until 30 March.[44] The POA was divided into four sub areas: the North, Central, South, and Southwest Pacific. The North was the region above 42 degrees north; the Central was bounded by the 42nd parallel and equator; the South was the area south of the equator, west of longitude 110 degrees west; and the SWPA included the remainder of the POA. Admiral Chester Nimitz served as commander in chief of all Allied forces in POA. He also directly commanded the Central and North Pacific Areas. Vice Admiral Robert Ghomley commanded the South Pacific.[45] On 18 April, President Roosevelt officially

chose his commander for all Allied air, sea, and ground forces in the Southwest Pacific--General Douglas MacArthur (see figure 8 for boundary locations).[46]

With a threefold mission to hold Australia, to prevent the Japanese from cutting supply lines to the U.S., and to prepare to take the offensive, MacArthur organized three new commands under his General Headquarters: Allied Land Forces commanded by Australian General Sir Thomas Blamey; Allied Air Forces commanded by Major General Brett; and Allied Naval Forces commanded by Vice Admiral Herbert F. Leary. Brigadier General Julian F. Barnes headed USAFIA (later redesignated as U.S. Army Services of Supply, USASOS).[47]

MacArthur formulated his future island hopping strategy based on the fact that the SWPA could only count on two or three U.S. and Australian divisions as well as only a small amount of air and naval forces. The Allies estimated that Australia would require 25 divisions or more to hold or defend the nation against a Japanese attack and invasion.[48] MacArthur reasoned that with such limited forces the best way to fend off the Japanese was to strike the enemy occupied islands, enemy naval forces, and enemy shipping before their approach to Australia. Since the Australian industrial regions of Victoria and New South Wales were richest in resources, he also theorized that the Japanese would focus their attack there. Therefore, he chose to take control of Port Moresby on the southern coast of New Guinea, since it controlled the air and sea lines of communication southward along the Australian coast.[49]

Consequently, MacArthur's plan was to go north to meet the Japanese; the Allies would heavily rely on assault landings with water transports and air strikes with bombers as primary weapons. Thus, the rapidity with which aviation engineers could build

airfields and airbases (an airfield with robust facilities) for Allied fighters and bombers would determine the effectiveness of MacArthur's strategy. Beginning 19 April 1942, Brigadier General Hugh Casey would direct these engineer efforts as Chief Engineer of SWPA.[50]

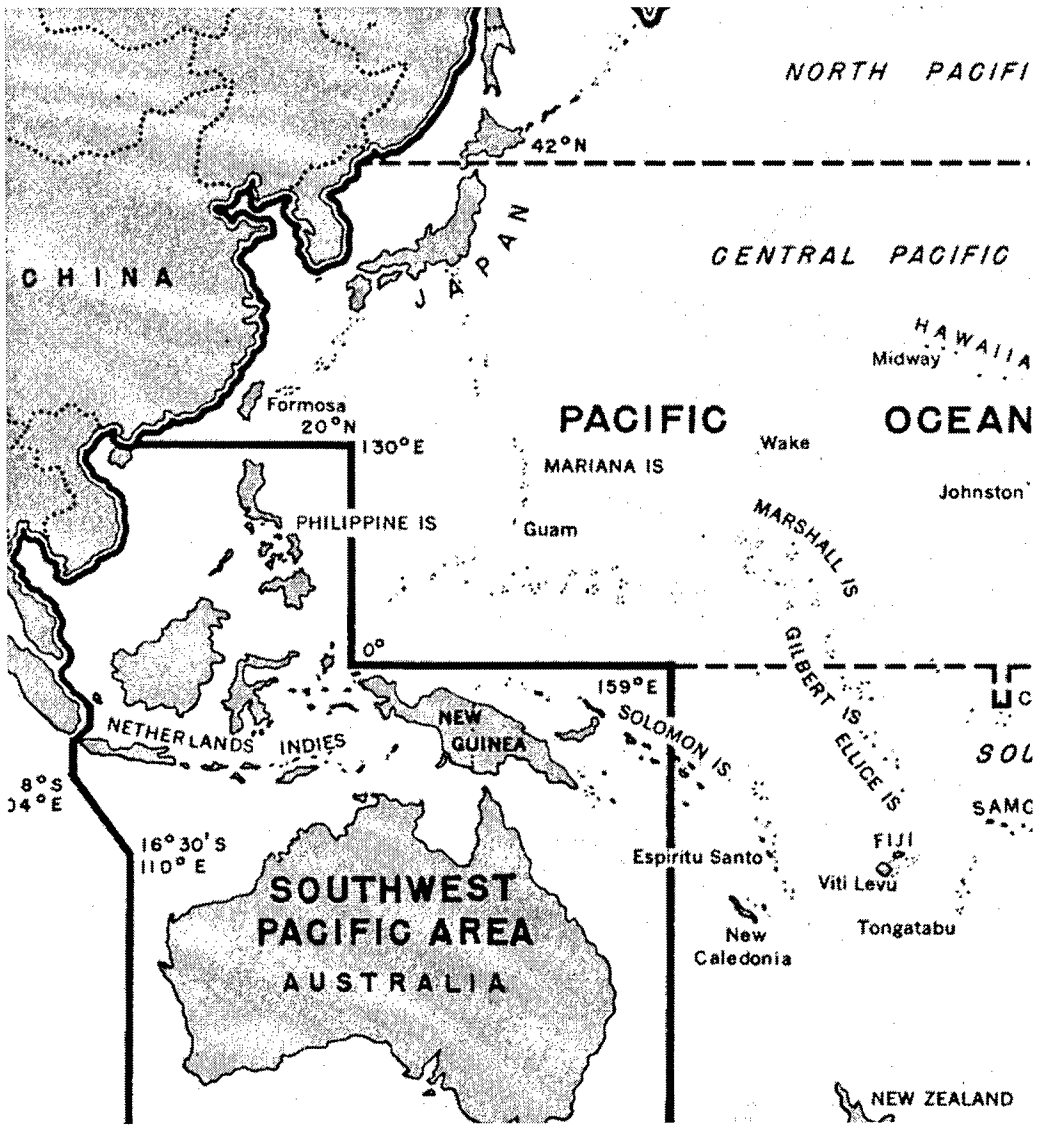

Figure 8. Theater of Operations for the Southwest Pacific and Boundaries
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 129.

The principal U.S. Army aviation engineer unit that Casey directed to build airstrips and airbases in northern Australia and New Guinea was the 808th EAB, which arrived in theater in early February 1942. Despite having little equipment they had already completed several airstrips in March. By May 1942, however, they were the best equipped and most experienced engineer unit in SWPA. They succeeded in not only creating new construction techniques, but also kept their equipment running through improvisation and adaptation of parts. As an example, ten men and their equipment could clear an area 5,000 feet long and 100 feet wide in ten hours by uprooting 12-inch diameter trees with cables from D6 model dozers.[51] According to the unit's history, "the drive and spirit of the 808th seemed to have caught the fancy of the Australians, and from Darwin to Alice Springs and southward the name of the battalion became the watchword for work and efficiency."[52]

The efforts of these soldiers, as well as others from the 43d and 46th General Engineer Service Regiments, resulted in eight completed fields in the Northern Territory by 1 July and seven more in progress. Additionally, engineers completed four fields at Port Moresby, one of which, Seven Mile (later named Jackson Drome), was an all-weather strip. The other three facilitated bomber landings in emergencies. Also, the field at Milne Bay, on the southern tip of Papua New Guinea, was started as well as a chain of fields at Cape York Peninsula (see figure 9).[53]

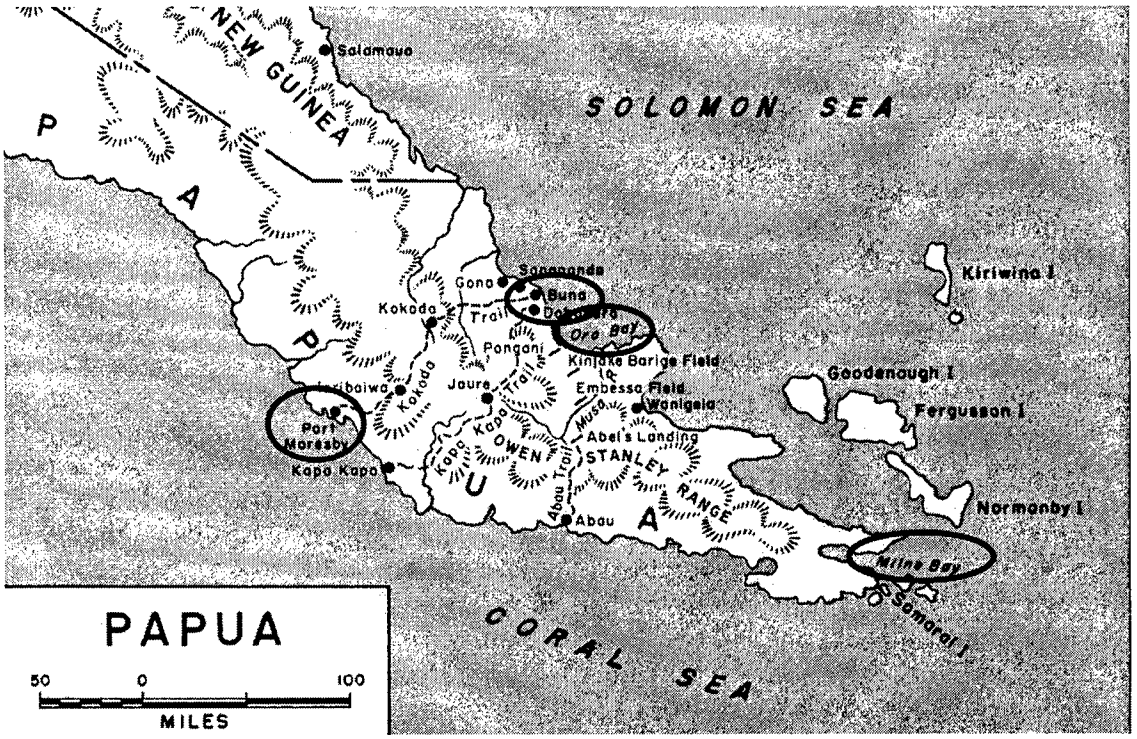

Figure 9. Papua New Guinea
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 173.

After the Allied victory in the Battle of Midway in June 1942, the Joint Chiefs directed Nimitz and MacArthur to initiate a joint offensive northwestward toward the Solomon Islands and eastward toward New Guinea with the ultimate objective of seizing the Japanese stronghold of the Southwest Pacific, Rabaul on New Britain Island.[54] Specifically, the Chiefs of Staff combined the plans of Nimitz and Ghomley with those of MacArthur into three phases: 1) taking Tulagi and adjacent islands; 2) seizing the northern Solomons, northeastern New Guinea, and west New Britain; and 3) capturing Rabaul.[55] Ghomley commanded the first phase and MacArthur commanded the second and third phases. The first phase of the operation was planned for 1 August 1942 with the

marines landing in the southern Solomons at Tulagi, which was about 800 miles north of New Caledonia.[56] MacArthur's plan, Code Name TULSA, would take his forces through New Guinea and the Solomons toward Rabaul.[57] Success in taking Rabaul depended upon gaining air supremacy over approaches to New Britain.[58] Consequently, this plan required more fighter and bomber squadrons in theater, and thus, more engineer work was necessary to build facilities and runways for these additional airplanes.

Although the 808th and other engineer units had accomplished a great deal so far, they could not keep up with the demands of Major General Brett who informed MacArthur on 10 July 1942 that 12 additional airbases were urgently required in New Guinea to support TULSA--four at Port Moresby, four at Milne Bay, and four at Buna on the northwestern coast of the island--to support 24 air squadrons.[59] So far only ten engineer units, about 6,000 men in all, had arrived in the SWPA since the attack on Pearl Harbor including one aviation battalion.[60] From the Army Air Force's point of view, all airbases were to be provided with dispersals (fortified aircraft positions with earthen berms on three sides) and sealed runways capable of taking heavy bombers. Brett pressed for "speedy consideration," "prompt action," and "rapid completion."[61]

With more requirements than assets available, the Army's leadership needed to formulate some creative solutions. Brigadier General Casey indicated that these proposals would require all of the ten engineer units in theater as well as the "withdrawal of all such personnel from northern Queensland and perhaps the Darwin area," to accomplish the mission.[62] Accordingly, the 808th EAB was transferred from Darwin to New Guinea between 15 and 25 July to improve one of the airfields near Port Moresby that the Allies had to hold at all costs.[63] As an advisor to Casey, Colonel Leif Sverdrup recommended

that Brett either lower his requirements or that more engineer units be transferred to SWPA--ten aviation battalions or their equivalent. Casey rejected the later suggestion and decided to maximize the amount of construction with available forces through the following: 1) cutting the runway length from 6,000 feet to 4,000 feet and treating runway surfaces with just enough chemical additives to control dust; 2) substituting landing mats for pavement; 3) reducing the number of dispersals; and 4) holding soldier housing to minimum standards.[64] He also prioritized mission locations in the order of Port Moresby, Milne Bay, and Buna. Brett accepted all of Casey's proposals except the shortening of the runways.[65]

Surprisingly, the Japanese acted more quickly in their New Guinea campaign than expected as a result of their failure at the Battle of Coral Sea. Their unsuccessful effort to take Port Moresby by sea resulted in a change in strategy in order to take it by land. The Japanese goal was to land first on the northern coast of Papua after which they were to advance through the mountains and take Moresby from the rear. The Japanese did this on 21 July 1942, placing enemy troops at Buna and then proceeding on the Kokada Train, reaching Kokada Village after one week--just 80 miles from Buna.[66]

The 808th EAB reached Moresby four days after 4,200 Japanese landed at Buna and Gonu. Their first mission was to build Waigani Field (later named Durand Drome) about 12 miles north of the town. This airfield was imperative if the Allied forces were to effectively bomb Buna, harass the column advancing along the Kokada Trail, and drop supplies to the Australian infantry units marching toward the enemy.[67]

At Port Moresby, the engineers found the terrain and jungle environment much more challenging than in Australian's Northern Territory. War planners did not anticipate

difficulties such as the absence of docks and roads, the vast number and steep slopes of hills and mountains, disease carrying insects, and thick vines, trees, and branches. Clearing trees 75 feet tall and two feet in diameter proved much more difficult; it required dynamite instead of just bulldozers. Tree roots were deep and branches were entangled with vines; air raids were frequent even during the day; nighttime was filled with mosquitoes and noises from the jungle.[68] These challenges persisted throughout the New Guinea campaign.

Army engineers focused their contributions on airfield and airbase development in New Guinea, yet progress was slower than the tactical situation required. By August 1942, 11,100 Japanese troops in New Guinea advanced further along the Kokada Trail to just 60 miles from Port Moresby.[69] The engineers had to act faster. The two operational all-weather airfields and two operational dry airfields already built out of the seven fields planned could not accommodate the number of planes required to halt the enemy.[70] Inadequate harbors and poor dirt roads leading to and from key installations added to the problem. Likewise, the single operational airstrip at Milne Bay was not adequate to accommodate strikes to the north. To improve construction speed and effectiveness, Colonel Sverdrup, head of construction in Casey's Engineer Office in GHQ SWPA, recommended that a single officer direct engineer activities in New Guinea when he visited Port Moresby in early August 1942.[71]

He voiced his concern through Brigadier General Casey to General MacArthur, resulting in critical leader appointments. MacArthur installed Australian Major General Sydney F. Rowell, commander of Allied troops in New Guinea, as the leader of the New Guinea Force (U.S. and Australian units including 7th Australian Division) with the

condition that he could only command U.S. service troops engaged in base construction when an attack was underway or imminent. Sverdrup realized that local direction in construction resources and priorities was lacking and concluded that "a senior officer well qualified in construction and planning must be sent to Port Moresby at once."[72] He believed that doing so would increase engineer productivity by 30 percent if work was managed properly.[73] His recommendation was enacted on 11 August when Brigadier General Richard J. Marshall, commanding general of USASOS, appointed Colonel Albert Matthews as Port Moresby base commander, responsible for the construction and supply of American forces at the Port Moresby and Milne Bay areas.[74]

Colonel Matthews's job was complicated by the increased construction demands of Major General George C. Kenney, who replaced Major General Brett as the Allied Air Force commander, and other command and control issues. Major General Kenney wanted two additional fields at Moresby, for a total of nine, and at Milne Bay he asked for three airstrips; he also wanted 227 revetments at Moresby alone.[75] With only 3,200 engineer soldiers and their equipment, including the 808th EAB, Colonel Matthews found these additions overwhelming, especially when given no priorities from GHQ, SWPA Headquarters, Fifth Air Force, or Headquarters USASOS.[76]

These complications were exacerbated by the deteriorating tactical situation in the vicinity of Moresby, which diverted aviation engineers from their airbase construction duties. By 11 September 1942, the Japanese were just 28 air miles from Moresby, and Major General Rowell ordered the 808th to stop work on all airfields and assigned them as the combat reserve northeast of Moresby along the Goldie River until the arrival of reinforcements in mid-September. It was evident that if the enemy were allowed to

advance any further, then New Guinea was lost, and perhaps Australia as well.[77] Fortunately for the Allies, the line held. Likewise, Major General Cyril A. Clowes, an Australian who commanded Allied forces at Milne Bay, halted work on airstrips number 2 and 3 at Milne Bay even after the Japanese withdrawal; instead, he placed the engineers on guard duty and had them build a dock.

Eventually, MacArthur had to order Blamey to get the engineers back on airfield construction and made some administrative adjustments. MacArthur subsequently created the Combined Operational Service Command for New Guinea under the New Guinea Force, headed by Brigadier General Dwight F. Johns who also served as the new Chief of Staff of USASOS to coordinate Australian and American service activities in forward areas. Operating from Blamey's priorities, Johns was responsible for all engineer work at the advance bases and prepared a coordinated plan to build airdromes, roads, ports, and other projects. Matthews, in turn, served as the Engineer, Advance Base, and had an Australian lieutenant colonel as his counterpart.[78]

Although engineers had made great strides toward completing the New Guinea airbases in September and October under Brigadier General Johns, the environmental conditions and rapid pace of operations took a toll on soldiers and equipment. Soldiers reported to sick call in large numbers and suffered from malaria, dysentery, dengue fever, and skin diseases. Since USASOS could not arrange for shipping space for supplies from Australia, units had to declare equipment inoperable because they lacked spare parts and mechanics.[79] The situation was made worse when torrential rains on 21 October washed out the shale base of the Jackson Drome and several roads and bridges.[80]

Frustrated by these setbacks on 26 October 1942, the command and control issue of the 808th EAB resurfaced as Kenney pointed out to MacArthur that two squadrons might have to be sent back to Australia, because they could not operate effectively without the proper facilities.[81] Major General Kenney believed that he should have operational control of the 808th. He wrote to Lieutenant General Richard Sutherland, MacArthur's Chief of Staff, to question why USASOS had authority over engineer aviation units.[82] Brigadier General Casey countered that he opposed placing the aviation engineers under air force control due to the small size of the engineer force in theater and the large amount of work to be done. He advocated centralization to minimize duplication and prevent competition for resources. Casey's view prevailed, and Kenney was temporarily placated when the Jackson Drome was repaired and two-thirds of the 808th was diverted to Durand Drome to accommodate B-17s that could not wait for the completion of runways at Jackson.[83] This commotion also allowed Casey to persuade Marshall to make shipping space available from Australia to New Guinea, yet shipping space was not the only logistical issue.[84]

Logistically supporting units, especially engineers, in the Southwest Pacific, provided commanders with constant challenges. An acute shortage of supplies, particularly class II and class IV stocks, was a constant problem. Before the war, planners did not confront the unique problems that commanders might face in the SWPA such as the large distances, the shipping shortage, the production shortfalls in the U.S., and the priority of the war in the European Theater. It appears that little thought had been given to the size and composition of engineer forces, let alone how to support these forces.

Furthermore, engineers did not receive detailed information on strategic plans in advance to make educated logistical requests.[85]

The War Department's plans for supplying engineers in the Pacific were unrealistic. The Army Assistant Chief of Staff G-4 authorized a 90-day supply for both class II and IV, and a 90-day reserve was authorized in July 1942; yet stocks never reached these levels due to rapid expenditures and the small number of items shipped.[86] Equipment and supplies took months to reach their destination because engineers were allocated a small amount of shipping space (only 14 percent) and engineers relied on shipments from the U.S. for items such as heavy machinery.[87] Therefore, engineer units often deployed without their equipment and waited months for the equipment to arrive. For example, the 828th EAB reached its Pacific Theater destination in mid-November 1942, but its equipment did not arrive until February 1943.[88] Consequently, much productivity time was wasted because engineers had either no equipment or inadequate amount of equipment. Containers or equipment missing manifests, shipping labels, or having incorrect ones compounded these logistical problems. Additionally, there were shortages of local shipping, problems of sorting and distributing cargoes, and a lack of port facilities, particularly in Brisbane, Sidney, and Auckland.[89] Finally, if engineer equipment did reach its user, there was the issue of resupply, maintenance, and adequacy.

Equipment was often in poor repair due to shortage of spare parts, mechanics, poor soldier training in preventive maintenance, and inadequacies in power and size. The clearing of dense jungle required heavy equipment; but often the equipment on hand was too light for these jobs. Equipment such as dozers would undergo continuous use, which would eventually wear down the equipment and make it inoperable. As a result, there was

always a shortage of spare parts. In addition, there were four different makes and models in theater, which exacerbated the challenge of servicing the equipment. At the end of 1942, 40 percent of all engineer equipment in the SWPA was inoperable.[90] Attempts to alleviate this problem were made with the cooperation of Australia and New Zealand. These nations attempted to increase their production of construction supplies and machinery.

Engineers learned to save resources and time through changes in their construction designs. The first lesson was that runway surfaces did not have to be as thick or firm as previously thought necessary. With the faster aircraft of World War II, most of the planes spread their weight over the wings as opposed to just the wheels. Therefore, concrete runways were no longer required. A more expedient and better wearing surface for controlling dust was to place a three to five-inch gravel base coated with four layers of bitumen material for heavy planes. Aviation engineers also used the Marston mat, or pierced steel planking, when it was available and a firm foundation existed.[91]

They also learned that the standard airdrome with three intersecting runways--each 300 to 400 feet in width--was no longer practical. One runway was reasoned to be sufficient since winds generally came from one direction for part of the year and the opposite direction for the other part of the year. Aviation engineers usually followed this construction sequence: (1) clear the jungle sites to create a landing area for transports; (2) lengthen and improve the runway for fighters; (3) stabilize the base for pavement and steel matting for bombers; and then, (4) construct something more than the barest essentials, such as temporary facilities, around the runways. A newly arrived aviation engineer unit would most likely complete the last step while the experienced aviation unit

who began the mission would have left the area after step (3) to develop new airbases in New Guinea or elsewhere.[92]

Other modifications included the removal of airbase accoutrements such as camouflage, revetments, hangars, and gasoline storage tanks. Although important early in the war, engineer commanders discovered that the enemy had little difficulty detecting airfields whether they were camouflaged or not.[93] Aircraft dispersal replaced camouflage in importance and effectiveness in forward areas. By the end of 1942, engineers also realized that the cost-benefit of aircraft revetments was no longer favorable. Initially, the engineers were tasked to build hundreds of them, each one consisting of a hardstand with earthen walls on three sides. Three dozers took three days to build each one. Instead of revetments, the best protection against Japanese air power was the Allied air force ready to meet it in mid-air.[94] Finally, hangars were seldom built, and gasoline storage tanks with fueler attachments at airfields in combat zones were a rarity.[95]

With these lessons learned and operations in Papua New Guinea headed toward successful completion, MacArthur continued with his island hopping strategy toward the Japanese stronghold, Rabaul. The aviation engineers that constructed the vital airstrips and airbases in northern Australia and New Guinea provided the necessary facilities for the B-17 bombers to shape the battlefield for the future campaigns. Army engineers who constructed airstrips in Dobodura in 1942 built the base that allowed air operations against the Japanese threat in nearby Buna. Their efforts materialized when the Japanese forces were defeated there in January 1943--one of the first victories over Japanese ground forces in World War II.[96] Additionally, the engineers who also developed the

Horando Drome in New Guinea, a facility that P-38 fighter aircraft used, would also set the stage for a favorable Allied outcome in the Battle of the Bismarck Sea in 1943.[97]

Clearly, aviation engineers working in Papua New Guinea began the construction journey to Okinawa, Japan that would eventually result in completing more than 200 runways in SWPA and hundreds of other construction jobs--roads, camps, docks, hospitals, depots, storage facilities, and barracks.[98] Yet, MacArthur needed to complete the second and third tasks that the Chiefs of Staff directed on 2 July 1942 in 1943. In the coming year, the number of aviation engineer units and their construction activities vastly increased in SWPA, demonstrating MacArthur's determination to neutralize Rabaul through airpower and his desire to continue the operational tempo through tactical gains. These forces provided the necessary stepping-stones along the New Guinea coastline to take back the Philippines from Japanese occupation.

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[2]Ibid., 57.

[3]Ibid.

[4]Ibid.

[5]Ibid., 58-59.

[6]Ibid., 63.

[7]Ibid.

[8]Ibid., 65.

[9]Ibid., 69.

[10]Ibid., 71.

[11]Ibid.

[12]Samual A. Goldblith, "The 803d Engineers in the Philippine Defense," *The Military Engineer* 38, no. 250 (August 1946): 323.

[13]Paul W. Ropp, "Thomas Delamore and the Defense of the Philippines: Heroism, Bureaucracy, and Fate," *The Journal of America's Military Past* 34, *no. 2* (Spring/Summer 2000), 92.

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[15]Robert M. Montgomery, "Brief History, Company A, 803rd Engineer Battalion (AVN) (SEP)," Memorandum to Adjutant General Office, Department of History and Records, Washington, D.C. (June 21,1946): 5.

[16]Goldblith, 325.

[17]Dod, 79.

[18]Goldblith, 323.

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[20]Dod, 79.

[21]Goldblith, 325.

[22]Dod, 79

[23]Ibid., 95.

[24]Goldblith, 325.

[25]Dod, 96.

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[28]Robert M. Montgomery, "Battle of 'Agoloma,' Bataan, Philippine Islands, January, 1942, Regarding Company 'A', 803d Engineer Battalion (AVN) (SEP)," Memorandum to Adjutant General Office, Department of History and Records, Washington, D.C. (June 24,1946): 7.

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[32]Dod., 93.

[33]Goldblith, 325.

[34]Dod, 109.

[35]Ibid.

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[38]Ibid., 123.

[39]Ibid.

[40]Ibid.

[41]Ibid., 140.

[42]Ibid., 126-127.

[43]Ibid., 127.

[44]Ibid., 170.

[45]Ibid.

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[47]Ibid.

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[49]Ibid., 130.

[50]Ibid., 132.

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[52]Ibid.

[53]Ibid.

[54]Ibid., 153.

[55]Ibid., 172.

[56]Ibid., 153, 172.

[57]Ibid., 153.

[58]Ibid.

[59]Ibid.

[60]Ibid., 152.

[61]Ibid., 153.

[62]Ibid.

[63]Ibid., 154 and Wesley C. Craven and James L. Cate, eds., vol. 7, *Services Around the World, the Army Air Forces in World War II* (Washington D.C.: Office of Air Force History, 1983), 277.

[64]Dod, 154.

[65]Ibid.

[66]Ibid.

[67]Ibid.

[68]Ibid.

[69]Dod, 173 and Meidling, 74.

[70]Dod, 174.

[71]Ibid.

[72]Ibid.

[73]Ibid.

[74]Ibid.

[75]Ibid.

[76]Ibid., 181-182.

[77]Dod, 182 and Meidling, 74.

[78]Ibid.

[79]Ibid., 186.

[80]Ibid.

[81]Ibid., 187.

[82]Ibid.

[83]Craven and Cate, 278.

[84]Dod, 187.

[85]Ibid., 210-211.

[86]Ibid., 211.

[87]Ibid., 212.

[88]Ibid.

[89]Ibid.

[90]Ibid., 212-213.

[91]Ibid., 219.

[92]Craven and Cate, 279.

[93]Dod, 219.

[94]Ibid.

[95]Ibid., 220.

[96]Barry W. Fowle, ed., *Builders and Fighters: US Army Engineers in World War II* (Fort Belvoir: Office of History, 1992), 356.

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CHAPTER 4

EXPANSION OF ENGINEER AVIATION UNITS AND THEIR MISSIONS, 1943

Tactical victories in Papua New Guinea in 1942 definitely set the stage for a long-planned offensive in the SWPA. At the conclusion of the Casablanca conference in January 1943, President Franklin D. Roosevelt and Prime Minister Winston Churchill agreed that one of the main objectives for the Pacific Theater in 1943 would be the execution of Tasks Two and Three from the Joint Chiefs' directive of 2 July 1942. Task Two was the seizure of the northern Solomons, northeastern New Guinea, and western New Britain. Task Three was the capture of Rabaul. MacArthur's campaign plan against the Japanese in New Guinea and the Solomons, Operation ELKTON, was a two-pronged drive toward Rabaul by SWPA forces along the coasts of New Guinea and western New Britain and by the South Pacific Forces through the Solomons. Shortly thereafter, the Joint Chiefs held a conference in March 1943 to reevaluate troop strength and available resources in preparation for the upcoming reduction of Rabaul, a campaign to be known as Operation CARTWHEEL.[1] The conquest of Rabaul required at least one key aspect: the progressive advance of air and naval forces. The units that would make these advances possible were aviation engineer units that would build the required airfields and bases in areas taken from the Japanese. Along with native workers and Australians, aviation engineers set the conditions to make more tactical gains in New Guinea and the surrounding islands in support of MacArthur's overarching strategy in the SWPA.

Under Operation TULSA (see Chapter 3), MacArthur expected the attack to commence on 7 August 1942 and to capture Rabaul by 25 August; however, the Japanese

attack on Milne Bay on 7 August delayed the TULSA plan until the spring of 1943. Operation TULSA would allow the Allies to maximize their sea power in more open waters through the capture of New Britain, New Ireland, and the Admiralty Islands. Since the enemy had a total of five aircraft carriers and between 10 to 12 divisions in the SWPA exclusive of the Philippine Islands, the Allies needed local sea and air superiority to compensate for land force numerical deficiencies. In summary, any success would involve "leapfrogging" from objective to objective, bypassing some Japanese garrisons and isolating them through locally superior naval and air forces.[2] The deployment of additional aviation engineers into SWPA would create the conditions for local air superiority. As a result of the European Theater's priority, no engineer units reached the SWPA between June 1942 and February 1943.[3] With the arrival of two additional aviation engineer battalions, a heavy shop company, and a maintenance company in February and March 1943, these units could set favorable conditions. Another aviation engineer battalion, a depot company, a base equipment company, two aviation airborne aviation battalions, and a dump truck company were scheduled to leave the United States in March 1943.[4]

In preparation for Operations ELKTON and CARTWHEEL in support of Operation TULSA, Colonel Leif Sverdrup, Construction Engineer of GHQ SWPA, and others made an extensive reconnaissance of the ground where the campaign was to be fought. In December 1942, they traveled through the Markham Valley in east central New Guinea, which was viewed as a critical area in the advance against the Japanese for suitable airfield locations. Aerial photographs found that the village of Nadzab with its favorable terrain and long dry season as well as the coastal village of Lae would make

favorable sites for heavy bomber and fighter airstrips. At Lae, there were already two airstrips that the Japanese built, so all that was necessary was to enlarge and improve the runways. Likewise, further aerial reconnaissance in February 1943 revealed that two little known islands--Woodlark and Kiriwina--halfway between Papua and the Solomons, contained promising areas for airfields.[5]

By 22 February, Brigadier General Hugh Casey had made a preliminary estimate of engineer requirements for ELKTON based on the following factors: amount of time allotted for phases of the operation, the number of recruited available native laborers, and additional construction demands. Aviation engineers were required to support combat soldiers as well as build airfields and roads in combat zones. Casey's staff estimated that engineers would have to construct 15 new runways, improve 16 airfields, and maintain 45 in total. Although not their primary tasks, aviation engineers would also assist combat engineer units in road building and road maintenance. In all, at least two additional EABs were required to complete these tasks as well as the associated depot and maintenance companies to support them.[6]

The unit analysis outcome of the Joint Chiefs of Staff and War Department planners' conference in March 1943 concluded that to support Task Two and Task Three of Operation TULSA would take $22^{2}/_{3}$ divisions and 4,000 aircraft. Since overall Army assets could not support those requirements, the decision was made to pursue Task Two, but with the additional objective of seizing the small islands of Woodlark and Kiriwina to the east of New Guinea and about 300 miles from Rabaul. These islands were important because bombers based on these two islands could easily strike Rabaul. MacArthur, who commanded Operation ELKTON, was to accomplish the following: establish airfields on

Woodlark and Kiriwana; seize various areas along the northeast New Guinea coast to include Lae, Salamaua, Finschhafen, and Madang; occupy western New Britain; and take the Solomon Islands as far as southern Bougainville. MacArthur and Admiral William Halsey, the South Pacific Theater (USASOPAC) commander, planned to accomplish this mission through 13 assaults over a period of eight months. The campaign would begin with invading Kiriwina, Woodlark, and New Georgia. Afterward, SWPA forces would seize areas along the eastern New Guinea coast while USASOPAC forces would attack the Solomons as far as southern Bougainville. Finally, SWPA forces would seize parts of New Britain and Operation CARTWHEEL would commence on 1 June 1943.[7]

Even with this reduction in requirements, Brigadier General Casey emphasized that existing engineer assets as well as the two engineer aviation battalions (EABs) on the way to the SWPA would not be enough for CARTWHEEL; by 30 January 1943, 176,254 U.S. soldiers served in the SWPA, of whom 23,909 were engineers--13.6 percent of the total force.[8] On 8 April the total air strength was 516 aircraft in the SWPA. 1,330 total planes plus a 25 percent reserve was expected to arrive in the SWPA by year's end.[9] To provide facilities for these additional aircraft required considerable engineer assets. Construction engineer work would be extensive during the first three months of the operation. Aviation engineers would rely heavily on New Guinea and Solomon Island natives to meet their construction needs.[10]

To support the upcoming campaigns, staff planners made preparations through unit moves and equipment requests in the first half of 1943, but challenges continued. By April, the 857th EAB arrived at Port Moresby to relieve the 808th EAB, which departed for Sidney, Australia for much deserved rest and relaxation. The 842d EAB, which had

just arrived in the SWPA, also came to Port Moresby for acclimatization and to replace other units being moved to forward areas. There was also a substantial increase in Australian (RAAF) engineer forces to augment U.S. forces in New Guinea. However, these increased numbers in manpower did not alleviate equipment supply issues. Casey wrote to Lieutenant General Eugene Reybold, Chief of Engineers, asking for any equipment--rebuilt or overhauled--from the Construction Division of the Office of the Chief of Engineers. Unfortunately for the Allies, chances were slim because of a shortage of rebuilt equipment to ship to the Pacific Theater and this source of equipment never materialized.[11]

Nevertheless, the engineers pressed on with their construction efforts in Papua New Guinea and Australia with the support of natives and Australians. Casey and Sverdrup visited forward bases in May 1943 to find substantial improvements in some areas, but slow progress in other areas. At Dobodura, engineers constructed a 5,000-foot runway surfaced with steel mat planks, while RAAF engineers on Goodenough Island were making noteworthy progress. Construction started at Milne Bay in June 1942 was behind schedule, so much that Casey recommended to Lieutenant General Richard K. Sutherland, MacArthur's chief of staff, on 9 May that more engineers should be sent. Unfortunately, USASOS had no units to give, but by 5 June, 2,824 Australians and 700 natives were working on bases in Milne Bay.[12]

Australia became and remained a major staging base in the SWPA. By 30 June 1943, 300 airfields had been built or improved in Australia since December 1941, ranging from grass strips without facilities to large airdromes with four or five paved runways. Interestingly, 48,000 civilians worked on these military base projects along with

the aviation engineers. Without the help of these workers and native laborers, the aviation engineers would have not been able to accomplish their mission in Australia and New Guinea at such a rapid pace.[13]

With bases in Australia and Papua New Guinea either built or in progress, planners focused on operational goals. Operational instructions for CARTWHEEL materialized by 13 June 1943. These included three major drives: (1) capture Salamaua, Lae, the Markham Valley, and Finschhafan by air, sea, and land; (2) prepare to seize, by airborne, overland, and shore-to-shore operations, the northern coast of New Guinea, including Madang and its surrounding area; and (3) seize the Kiriwa Islands with elements of the Sixth Army under General Walter Krueger, and meanwhile, capture nearby Woodlark using South Pacific forces. USASOPAC under Halsey was to capture Japanese held areas in the central Solomons and hold off the enemy with air and naval forces operating from bases in the northern part of the island chain. USASOS was to develop advance bases in the parts of New Guinea taken from Japan.[14]

In support of these three drives, engineers were to maximize their efforts to construct airfields in New Guinea and nearby islands (see figure 10). In the Markham Valley, the chief mission was to improve existing airfields at Bena Bena, to build a new one at Tsili Tsili, and to enlarge an airstrip at Nadzab followed by construction of a second strip. To accomplish these missions, two airborne aviation battalions were allocated for Tsili Tsili, three aviation battalions were for Markham Valley, and six EABs as well as other engineer assets for Lae and the Lower Markham Valley. Meanwhile, engineer units under the Sixth Army would complete the missions at Kiriwana and Goodenough as required by the Army Air Force, and they would also accomplish tasks

on Woodlark as directed by the USASOPAC commander. Additionally, the USASOS commander pushed completion of facilities at Cape York Peninsula, Port Moresby, Dobodura, and Milne Bay. No matter which location was occupied, the first construction priority at each was to build a landing strip with aircraft dispersals. In the SWPA, USASOS engineers began construction as soon as the Japanese were cleared.[15]

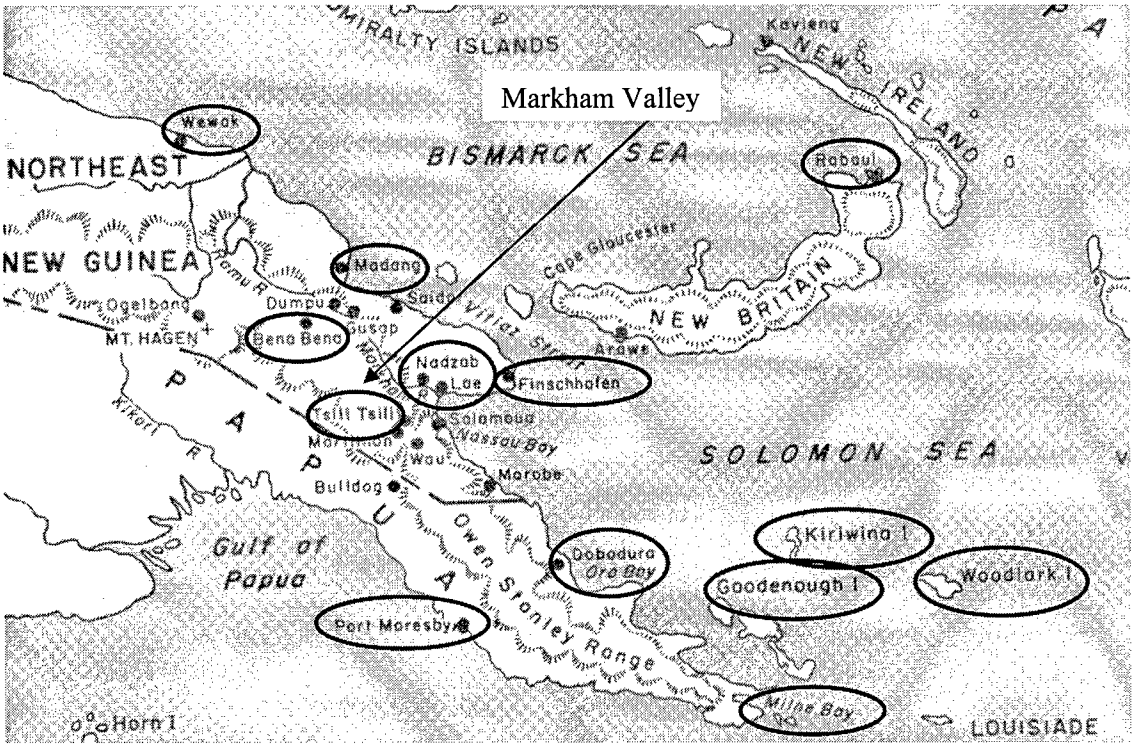

Figure 10. Combat Zone, 1943
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 226.

Airborne aviation engineers spearheaded construction efforts in the Markham Valley jungle in mid-year 1943. In May and June, two airborne EABs arrived in Australia: the 871st and the 872d, consisting of 30 officers and 500 men each. Designed

to be transported by C-47s or 15-man gliders, their equipment was lightweight with the heaviest piece, a tractor without its bulldozer blade, being one and one-half tons. 20 C-47s were required to carry one fully equipped company 1,100 miles. Their job consisted of the following: (1) to land with paratroops and rehabilitate captured airdromes or (2) to land with an amphibious force and quickly build new landing strips. These units could also build airfields in remote areas where machinery could not move overland.[16]

The Allies required an airbase at Tsili Tsili not only for fighters, but also for refueling bombers that were neutralizing the Japanese air and naval forces at Wewak in northeast New Guinea.[17] The 871st Airborne EAB deployed through the Markham Valley in support of this task. After receiving additional machine guns and additional training for unloading planes, the unit was ready for the mission. An advance party, five men, of Company C arrived with an anti-aircraft battery on 7 July. Two days later the remainder of the company, about 125 men, was loaded and flown over the Owen Stanleys to Tsili Tsili on 30 planes. The engineers immediately improved one airstrip at Tsili Tsili and completed it by the end of the second day. Meanwhile, natives cleared land nearby for bogus airstrips in support of a deception plan to distract the Japanese, which proved successful since the enemy later bombed those areas instead of the airstrip at Tsili Tsili.[18]

Later, Company C began another strip at Tsili Tsili in an area where the kunai grass grew six feet high. Approximately, 400 natives also helped to clear the area while Australian infantry provided local defense. When the rest of the battalion landed on 21 July, their arrival delayed ten days because of bad weather, the transport runways were extended to 5,000 feet and the fighter strip runway was extended to 4,600 feet.[19] The 871st Airborne proved their worth when the first fighter plane landed on 26 July. By this

time, the new runway also had the capacity of 150 transports a day.[20] Construction at Markham Valley continued to go well and faster than expected; numerous planes were soon stationed at the field by August.[21]

Late August brought the Allied assault on Lae. The Japanese had entrenched there due to the growing threat from the west. Airborne engineers' work at Tsili Tsili and plans for additional strips nearby facilitated a closer assault to the enemy positions. On 6 September, the 871st EAB landed at Nadzab with most of its equipment, which was about 50 miles northeast of Tsili Tsili and 25 miles west of Lae. With the enemy only eight miles away, they laid out a new and better landing strip at Nadzab. Although conditions were more difficult because of heavy rains and the airborne equipment was insufficient for the vast amounts of earthmoving, the airborne engineers were able to help the Allies speed up their advance. Within four days of their arrival, the airborne EAB finished the airstrip, and 420 transports landed a few days after its completion.[22]

On 11 September, the Allies captured Salamaua and four days later Lae fell, which allowed the 842d to relieve the 871st at Nadzab.[23] The incoming EAB concentrated on a second runway, and in October, they focused their efforts on graveling a third strip while employing several hundred natives to complete these tasks. The installation of a gravel base was used to support steel plank matting prior to the rainy season in order to facilitate fighter landings. Two of the three runways remained serviceable in all kinds of weather and required little maintenance. The 842d also went to work on road building, including a 25-mile stretch from Lae to Nadzab, making it possible to move heavy equipment from the Lae harbor to the Nadzab base. By year's end, four fighter squadrons and two medium bomber squadrons were based at Nadzab.[24]

From September through December 1943, engineers continued with airfield construction in New Guinea's interior. In addition to Tsili Tsili and Nadzab, airborne engineers began a third major airfield at Gusap, which had favorable soil conditions and a good climate, in the far northwest portion of Markam Valley. The advance party of the 872d Airborne EAB laid out the landing strips and taxiways in October and the rest of the unit arrived later that month to work toward completing an all-weather airfield, including complete servicing and repair facilities and runways to handle 200 transports daily. By mid-November a 6,000-foot gravel-surfaced runway was almost finished. The 871st arrived in November to augment the 872d's efforts at Gusap. By December, their efforts produced a 5,000-foot asphalt strip section, several fair weather strips, and numerous buildings such as mess halls, screened window buildings, and support facilities.[25] By the end of 1943, a fighter runway was completed with a steel planked runway.[26] These runways--Tsili Tsili, Nadzab, and Gusap--were all used to launch heavy air attacks on Rabaul.

Coincidently, by mid-December the strategic decision had already been made to neutralize and bypass Rabaul rather than capture it. Planning staffs reasoned that this would speed up the Allies' advance toward the Philippines and the Japanese home islands. Churchill and Roosevelt approved this recommendation at the Quebec Conference, forwarding their decision to MacArthur.[27]

Meanwhile, EAB engineers also contributed to air strikes from the newly captured Japanese base at Finschhafen, east of Lae. The rapid conquest of this area in September made possible the creation of a base on the Huon peninsula.[28] In October 1943, Major William Ellison, Jr., commander of the 808th EAB, and his staff surveyed the existing

airfield to build an advanced airdrome. On 23 October, the 808th arrived at Langemak Bay, just south of Finschhafen, to work on the existing airfield with a battalion of Navy Seabees. On 5 November 1943, MacArthur then directed that a major base be constructed at Finschhafen to support air, ground, and naval forces.[29] By 10 December, the Finschhafen runway was surfaced with a pierced plank runway on a coral base, but the entire airbase would not be finished until 1944--progress was hindered by the Fifth Air Forces' fighter aircraft arrivals that interrupted the work schedule.[30] Nevertheless, Finshchhafen would soon become a major Allied staging and storage base.

Engineer work at Lae and Finschhafen continued under USASOS. The scope of work at Lae increased significantly with the major effort turning to a road to Nadzab, especially when the heavy rains made the road unserviceable. The 836th and 857th EABs did most of the road improvements, completing the road by mid-December. Additionally, these engineers completed a steel mat runway and provided semi-permanent housing for 900 soldiers.[31]

Although most of the engineer efforts were concentrated on bases and airfields along the northern New Guinea coast, work in soggy terrain at Milne Bay, Oro Bay, and Port Moresby continued. Since work was behind schedule at Milne and Oro Bays, MacArthur directed the Sixth Army to take over, while USASOS was already operating in forward areas. The demand for engineers at the two bases continued to be enormous, but by the end of the year two airdromes in operation existed at Gurney and Turnball. Oro Bay or Base B had eight runways of bitumen or steel mat and one-half million square feet of covered storage. By the end of 1943, work was completed at Port Moresby--six

airfields and 80 miles of road. At the start of 1944, almost all engineers left Port Moresby for forward areas.[32]

As with 1942, many of the same issues with aviation engineer units arose: concerns with command and control, issues with logistics, and problems with the lack of resources. With the addition of engineer battalions in 1943, came the difficulties of organizing them. The Army Air Force, particularly, Major General George Kenney, tried again to gain control of engineer aviation units and again, Brigadier General Casey strongly opposed this in February 1943[33]. Casey argued that if aviation units were under the control of the Air Forces, then there would be two construction agencies in the same theater that would complicate the allocation of materials, equipment, and spare parts as well as overall planning for construction. Casey also believed that engineer units in the communications zone should fall under the operational control of USASOS. MacArthur settled this issue once more in February 1943 when he directed that airfield construction must continue with USASOS in command in the communications zone. Task force commanders would maintain construction responsibility in the combat zone until transferred to USASOS. Finally, once engineers finished airfield construction, responsibility would go to the Army Air Forces for maintenance. [34] This decision remained firm for the remainder of the war.[35]

Nevertheless, MacArthur did make some changes to improve the administrative control of all units in the SWPA. He reconstituted the United States Army Forces in the Far East (USAFFE) on 26 February 1943 and consolidated administrative control of all American forces--the USASOS, the Fifth Air Force, and the newly arrived Sixth Army--under the USAFFE. Brigadier General Casey not only served as the Chief Engineer for

GHQ SWPA, but he also served as the Chief Engineer for the USAFFE. As Chief Engineer, USAFFE, Casey provided technical supervision, and as Chief Engineer, GHQ SWPA, he still coordinated all Allied engineer support in the SWPA.[36]

In 1943, supply stocks and equipment were low for the engineers due to critical shortages, time required for requisition processing, and transportation shortfalls to deliver supplies. In late 1943 for the SWPA, only about seven percent of necessary class II supply items to support needs for 180 days were on-hand. Class IV items were equally as scarce. About 300 days elapsed between the time an engineer unit in the SWPA sent a requisition to the U.S. and the time the troops received the supplies. About one-third of this time was taken up with the transshipment of stocks from Australia to New Guinea. Overall, critical engineer supply shortages included lumber, pipe, electrical wiring, and fittings. Corrugated iron for covered storage containers, nuts, bolts, and steel rods were in especially short supply in the SWPA. Australia was able to supply most of these items, but with the exception of cement, none were in adequate quantities.[37]

Supply distribution in the SWPA was equally problematic. USASOS set up engineer depots at various forward bases, but it had no systematic procedure for requisitioning supplies. Therefore, most units in New Guinea tried to get their supplies outside of the Army system and continued to order them from Australia. Even if ordered items arrived in theater, locating ordered stocks was also an issue. These distribution difficulties were compounded by an inadequate number of engineer depot companies in the SWPA. Throughout most of 1943, there was only one depot company in the SWPA; three more arrived in the second half of 1943, but there were still too few.[38]

Engineer equipment shortages were also acute, because engineers not only needed more equipment, but heavier equipment. Major General Kenney was disappointed with the airborne EAB, not only because it contained only two-thirds of the personnel and equipment of a regular EAB, but also because its equipment was neither heavy nor sturdy enough for major construction tasks in the thick, jungle terrain. The kunai grass clogged the light scrapers, while the smaller graders slid across the ground. Consequently, with the exception of the 871st at Tsili Tsili and Nadzab and the 872d at Gusap, the airborne EABs conducted most of their missions in the rear area of operations, performing routine tasks. By 1944, these units either traded their equipment for heavier machinery or they were assimilated into regular EAB units.[39] Lieutenant General Reybold summed up the dire heavy equipment shortage situation best when he stated, "Not only must all of this [heavy equipment] be manufactured in the United States and be transported to the Pacific bases, but it must be shared with all of our Allies around the globe whom we are supplying [and] there is still not enough of it to go around."[40]

In addition, tremendous shortfalls of tractors, graders, cranes, concrete mixers, ditching machines, and welding equipment occurred in the SWPA. The organizational equipment table of allowances along with the severe maintenance and parts shortage issues simply could not keep up with the workload demand. Engineer units continued to arrive in theater without their equipment. As in 1942, equipment did not arrive until months after the personnel arrived. When a unit's equipment arrived, it was scattered on different ships and at different ports in theater. For example, the 839th EAB's equipment arrived on 11 various ships and the 864th EAB's equipment arrived on 18 different ships.

Although the War Department required the SWPA GHQ to submit Material Status Reports on equipment, it was unable to help with shortfalls.[41]

Likewise, obtaining spare parts and maintaining equipment were challenges. Spare parts required for shovels, tractors, motor graders, and carryall scrapers were scarce in the SWPA for a number of reasons: (1) larger requirements than anticipated; (2) greater number of machinery that was too light for the work; (3) continuous use for up to 20 hours a day, seven days a week; and (4) non-standardized engineer equipment. Parts were often not received until eight months after being requisitioned. When the 842d EAB left San Francisco on 26 February 1943, its second echelon parts for its D7 tractors, which should have been automatically sent with the unit, were not shipped until five months later. The lack of personnel trained to distribute spare parts and the lack of storage for spare parts only exacerbated the problem. In 1942 and 1943, no spare parts companies existed in the SWPA. For example, at one point in Milne Bay there existed 1,300 crates of spare parts, but there were no personnel or storage spaces to manage them. As a rule, construction units had to repair and maintain their own equipment as best as they could with whatever spare or improvised parts they could find or make. The first maintenance and heavy shop company did not arrive in the SWPA until April 1943.[42]

The employment of native workers mitigated many problems when organic machines and equipment failed or when too few heavy machinery pieces existed. Engineer equipment operated for up to 20 hours a day, stopping only for maintenance and repair. Equipment overuse as well as losing men to small engineer detachments hindered construction progress. Airborne EAB equipment proved too light in 1943 for clearing dense jungles. Since no spare engineer equipment was sent from the U.S., engineer units

had to rely heavily on native workmen, especially in New Guinea, bartering goods, beads, or highly prized shells for their work. By mid-June 1943, approximately 24,000 Papuans were employed on Allied engineer projects. Without these native laborers, EAB units could not have built their airstrips and airbases in support of MacArthur's SWPA strategy in the time required.[43]

As a result of these many logistical problems, engineers had to modify their construction standards to accomplish the mission with fewer assets. In the SWPA, a landing field now consisted of a single runway. If a second one was put in, it ran parallel to the first instead of perpendicular. Each runway was initially grass, and, if time permitted, it was improved with a steel mat, coral, or bitumen surface. In the August 1943 issue of *Aviation Engineer Notes*, an Army Air Force publication, one article summed up the construction as consisting of three phases: (1) hasty construction of natural surface landing strips, with or without the use of steel runway mats, for the use of fighters and light bombers; (2) construction improvement to an all-weather strip--possibly with a steel mat surface--and limited facilities; and (3) permanent construction with two or more hard surfaced runways and fairly complete facilities, including housing. As of April 1943, most airfields were of phase one type construction; 22.6 percent, 27 percent, and 29.1 percent of all runways were surfaced with stabilized earth, gravel, or sealed earth, respectively. Less than one percent was sealed with concrete material.[44]

In the SWPA, EABs also minimized their building efforts in order to save time and resources. Troops lived in tents, and if possible, screened and floored mess halls and kitchens were built with local materials. Aviation engineers were instructed to maximize local materials and local labor as stated in *Aviation Engineer Notes*: "The more local

labor is used, the fewer Service troops will be required to do the job and the more Service troops will be available for speedier accomplishment of tasks in forward areas that must be done by military personnel."[45] Another alternative solution that emerged in late 1943 to save time was incorporating prefabricated buildings. Engineers developed a number of standard types; the three major ones were 20, 47, and 88 feet wide of variable lengths with 20 by 54 feet the most common.[46] These timesaving techniques allowed rapid airfield and base construction that facilitated fighters and bombers to shape and sustain future tactical and operational gains.

The capture of Finschhafen in September 1943 was one such tactical gain that cleared the way for the last phase of Operation CARTWHEEL--the seizure of western New Britain which would give the Allies great advantages and the ability to neutralize the Japanese at Rabaul through airpower. By the end of 1943, MacArthur's pattern for seizing enemy territory in the SWPA consisted of the following: air bombardment, naval bombardment, assault force landings, defeating the enemy, and construction of airfields and base facilities. This pattern allowed the Allies to advance 1,500 additional miles in the SWPA in the first eight months of 1944.[47]

With Rabaul nearly neutralized and bypassed, the engineers' numbers in the SWPA soared from 7,594 in 1942 to 42,285 in January 1944--14 percent of SWPA Army strength.[48] The most significant aspect of aviation engineer operations at the close of 1943 and the beginning of 1944 was that these soldiers were not working behind the combat forces, but rather they were working right beside them. As soon as the first combat soldiers landed in forward areas, the engineers followed to begin airbase construction. On 26 December 1943, the 1st Marine Division landed at two points on

Cape Gloucester, the western portion of New Britain. Two Japanese airstrips already existed and the 841st, 864th, and 1913th EABs immediately arrived and installed two parallel runways. On 2 January 1944, General Krueger, commander of Sixth Army, attacked Saidor on the New Guinea coast. The 808th arrived three days later and extended the existing runway to 6,000 feet with the help of the 860th and 863d EABs. This speed depended on how fast aviation engineers could build airstrips. The Allies moved up the New Guinea coast, and across to New Britain and the Admiralty Islands in 1944 with the return to the Philippines in their sights.[49]

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[1]Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers: The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 225.

[2]George A. Meidling, ed., *Engineers of the Southwest Pacific 1941-1945*, vol. 1, *Engineers in Theater Operations* (Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, 1947), 88-89.

[3]Barry W. Fowle, ed., *Builders and Fighters: U.S. Army Engineers in World War II* (Fort Belvoir: Office of History, 1992), 356.

[4]Dod, 227.

[5]Ibid., 230-231.

[6]Ibid., 231-232.

[7]Ibid., 234.

[8]Ibid., 243.

[9]Ibid., 234.

[10]Ibid., 234-235.

[11]Ibid., 235-236.

[12]Ibid., 239-240.

[13]Ibid.

[14]Ibid., 244.

[15]Ibid., 244-245.

[16]Ibid., 247.

[17]Wesley C. Craven and James L. Cate, eds., vol. 7, *Services Around the World, the Army Air Forces in World War II* (Washington, D.C.: Office of Air Force History, 1983), 280.

[18]Ibid., 280.

[19]Dod., 248.

[20]Craven and Cate, 280.

[21]Dod, 248.

[22]Craven, 281

[23]Dod, 252.

[24]Craven and Cate, 281.

[25]Dod, 254.

[26]Craven and Cate, 282.

[27]Dod, 255.

[28]Craven and Cate, 282.

[29]Dod, 258.

[30]Ibid., 259.

[31]Ibid., 258.

[32]Ibid., 257-259.

[33]Craven and Cate, 277.

[34]Dod, 229-230.

[35]Craven and Cate, 278.

[36]Ibid., 229-230.

[37]Ibid., 260-262.

[38]Ibid., 263.

[39]Craven and Cate, 281.

[40]Eugene Reybold, "Engineer Equipment in the Theaters of Operations." *The Military Engineer* 36, no. 220 (February 1944): 61.

[41]Dod, 264.

[42]Ibid., 265-266.

[43]Ibid., 268-269.

[44]"Runway Construction Trends," *Aviation Engineer Notes,* no. 14 (August 1943): 9-10.

[45]"Notes on War Construction," *Aviation Engineer Notes,* no. 15 (September 1943): 10.

[46]Dod, 266-267.

[47]Ibid., 520.

[48]Fowle, 359.

[49]Dod, 274-275.

CHAPTER 5

ENGINEER AVIATION UNITS PUSHING ALLIES NORTH, 1944

During the first eight months of 1944, the war in the Southwest Pacific progressed in much the same way as it had at the end of 1943. As discussed in Chapter 4, Allied forces executed a pattern for seizing Japanese held territory as they fought their way north toward the Philippines: conduct air and naval bombardment, land the assault forces, defeat any Japanese units in the area, and construct airfields and base facilities. In order to support an eventual recapture of the Philippines and to fulfill MacArthur's promise that "[He] shall return," this plan was successfully implemented for 1,500 miles along the New Guinea coast and nearby islands in the first eight months of 1944. Along the way, enemy strongpoints and sizeable concentrations were bypassed where possible.[1] From December 1943 to September 1944, ten major landings were conducted in the Southwest Pacific.[2] While discussing expanding engineer operations as well as logistical and supply shortcomings, this chapter relates how engineer aviation units contributed to these Allied victories along the New Guinea coast and neighboring islands--the Admiralty Islands, Hollandia, Wadke, Biak, and the smaller base island areas. Airfield and airbase construction at these geographical locations successfully facilitated the invasion of Leyte at the conclusion of 1944 and Luzon in early 1945, thus fulfilling MacArthur's promise.

Engineer troop strength and operational planning ballooned in 1944. As of 1 January 1944, engineer numbers in the Southwest Pacific reached 42,285--a fivefold increase since January 1943. The United States Army Services of Supply (USASOS) field organization in Australia, now headed by Colonel Lewis T. Ross, steadily dismantled its operating locations there and moved them to New Guinea. USASOS

continued to carry out its logistics missions with regard to engineer construction, supply, and training. The Sixth Army Engineer Section, located on Goodenough Island, made plans under the auspices of its leader, Colonel Samuel D. Sturgis, Jr., to drive northward along the New Guinea coast. The Sixth Army engineers would play a critical role in supporting Sixth Army's combat arms amphibious landing forces moving north along the New Guinea coast; these units started the necessary new airfield and base construction that allowed Allied air power to subsequently shape and sustain each combat force landing and neutralize Japanese strongholds.[3]

To carry out these missions, task force commanders within the Sixth Army had the responsibility for airfield and base construction along their advance route. Colonel Sturgis, however, selected the task force engineer for each operation. Since no standard tables of organization and equipment or standing operating procedures (SOP) existed, each task force engineer, his staff, and engineer organization were unique. Thus, one of the most critical issues that the task force commander and task force engineer had to resolve was how to task organize the appropriate engineer units to simultaneously provide combat support and to assume base construction. Although GHQ SWPA determined the final construction requirements, the task force commander started construction within his specified area. The task force engineer staff's duties included laying out detailed plans, establishing priorities, and employing the most effective and efficient use of construction units within the task force's specified area. To facilitate successful mission accomplishment for task force commanders and task force engineers, Colonel Sturgis and Brigadier General Hugh Casey, GHQ SWPA Engineer, worked closely together.[4]

The first assault in the SWPA in 1944 was against the strategically important Admiralty Islands--200 miles northeast of New Guinea and 350 northwest of Rabaul. The Admiralties consisted of one large island, Manus, which was 60 miles long and 20 miles wide (see figure 11), and Negros Island to the east of Manus, which included two bays--Seeadler Harbor to the northwest and Hyane Harbor to the east. South of Hyane Harbor was the Japanese-built Momote airfield. The Lorengau landing strip was on Manus.[5]

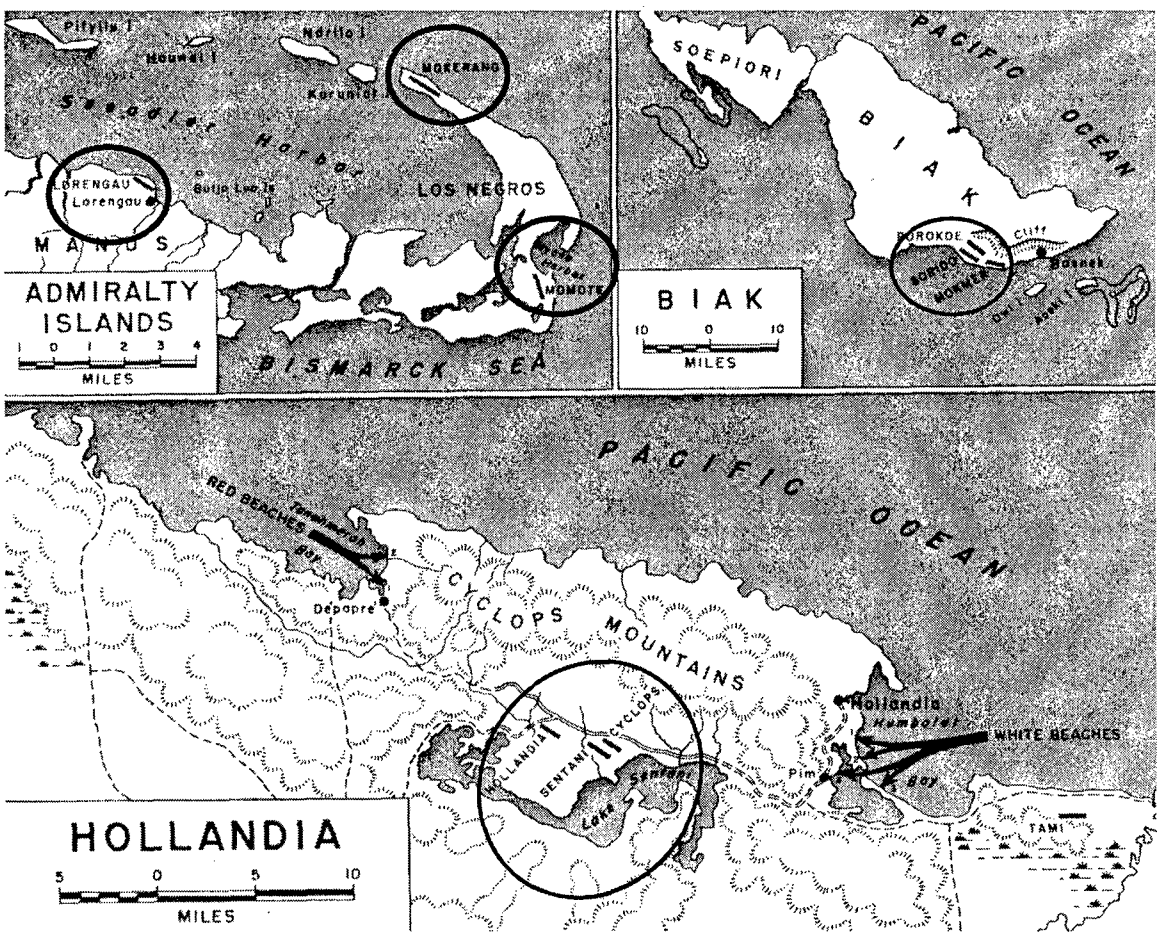

Figure 11. Admiralty Islands, Biak, and Hollandia
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 528.

On 13 February, General MacArthur directed General Walter Krueger, the Sixth Army Commander, to seize the Admiralty Islands, begin work on a naval base, and improve the two existing Japanese airfields there. Since Japanese air strength was weak in the Bismarck Sea area, MacArthur decided to launch a reconnaissance in force at Hyane Harbor on 29 February instead of a full-scale attack on 1 April. If the reconnaissance group found Momote lightly defended, then the amphibious assault would follow immediately. By 6 March, the beachhead and Momote airfield were secured, and the next objectives were the Japanese positions on Manus and the Lorengau airfield. [6]

Krueger changed his plans to meet MacArthur's intent, and he assigned initial airfield construction to the 40th Naval Construction Battalion and detachments of three other naval battalions under the supervision of the task force engineer, Colonel William Wanamaker. MacArthur directed Krueger in mid-March to enlarge airfield and base development scope from building one fighter field to building two heavy bomber fields. The purpose of these fields was to relieve overcrowding on New Guinea airfields and to provide bomber runways to support operations in the west. Therefore, Colonel Wanamaker proposed extending the Momote runway for heavy bombers, and he suggested constructing a second bomber field in a coconut plantation on the Mokerang peninsula. Colonel Sturgis and Colonel Leif Sverdrup of GHQ SWPA approved these suggestions and sent additional engineer units to assist the existing units in construction efforts. Additional Army and Navy units dispatched to the islands included: a detachment from Headquarters and Headquarters Company, 931st Engineer Aviation Regiment which arrived mid-March (D plus 19); the 836th EAB and the 617th Base Equipment

Company which disembarked at the end of March; and the 104th Naval Construction Battalion which arrived on 1 April.[7]

Army and Navy engineers--the 40th and 78th Naval Construction Battalions, the 8th Engineer Squadron, and the 836th EAB--worked together to complete the Momote Airdrome extension from 5,000 to 8,000 feet by D plus 46 (15 April). To complete this task, they overcame obstacles such as crossing a swamp, working around incoming and outgoing plane traffic, and constructing large dispersal areas. The 931st Engineer Aviation Regiment commander assumed overall leadership of the operation.[8]

The 931st Engineer Aviation Regimental Headquarters also designed the Mokerang airdrome and supervised its construction. After the 46th Naval Construction Battalion began work on this field, clearing and removing 300 feet of coconut trees, the 836th EAB along with the 617th Engineer Base Equipment Company cleared an area for a 7,500-foot strip. The technique consisted of blasting and digging out solid coral for the runway base, grading and compacting it to a depth of six inches, and then surfacing it with bitumen.[9] Considerably later, the 821st EAB arrived to take over construction of a second runway, and the 836th EAB moved on to participate in a new invasion. By 1 April, the arrival of additional engineers to the harbor meant that only 18 additional days were required to complete the first bomber runway. Amazingly, for this airdrome alone, engineers accomplished the following: (1) cleared 1,100 acres, including 18,000 coconut trees; (2) removed 360,000 cubic yards of surface debris; (3) graded 172,000 cubic yards of coral of which 20 percent was blasted; and (4) spread 180,000 gallons of bitumen surfacing coating.[10] Proud of the engineers' accomplishments at Momote and Mokerang, Sverdrup remarked after seeing these operational airfields on 21 April, "Meeting the

deadlines, is in my opinion the finest construction achievement yet accomplished in SWPA. It was accomplished by a tremendous amount of energy and drive."[11]

The airfield missions in the Admiralties were not executed without command and control issues. Wanamaker's problems stemmed mostly from interservice rivalry. From the start, the naval construction battalions were not officially placed under his control even though the assumption was that they would do most of the construction, and as a result, they would not take orders from him. He was forced to take the circuitous route of giving orders through the 17th Naval Construction Regiment. Sometimes his orders were followed, but sometimes his orders were disputed. To meet airfield construction deadlines, the Naval Construction Battalions (Seabees) were tasked to assist to do this construction rather than construction on naval facilities, which led to antagonism from naval commanders who thought that their units should focus on naval projects. Initially, some Army units were uncertain of their chain of command. The 836th EAB chronicler reported, "Upon arrival this station the usual existed. We knew not to whom we were assigned." Nevertheless, the task force engineer operationally controlled the construction battalions by early April.[12]

Because the Admiralties were seized one month ahead of schedule, the SWPA campaign was accelerated. On 12 March, the Joint Chiefs directed MacArthur to speed up airfield construction on the Admiralties and to capture Hollandia, 200 miles west of Wewak. Significantly, bombers flying from Hollandia could reach western New Guinea and the Palau Islands, thus striking deep into Japanese territory. The assault, to be conducted by the 24th and 41st Infantry Divisions staged at Goodenough Island and Finschhafen, respectively, was planned for 22 April.[13]

Hollandia was both a small settlement on the northern shore of New Guinea and the name of an area west of the Netherlands New Guinea boundary, 50 miles along the coast and 40 miles inland (refer back to figure 11). Except for the area around Lake Sentani, the terrain was rugged. Two small, yet suitable beaches existed for landings--Humbolt and Tanahmerah Bays.[14] Three Japanese airstrips existed south of the Cyclops Mountains and north of Lake Sentani.

With as many as 25,000 engineers participating[15], plans dictated that Hollandia be developed into a major air and supply base, capable of handling 180 days of supply for 200,000 men.[16] Nine EABs and three airborne EABs, more than 7,500 men[17], along with other engineer units would be employed to construct six airfields, an air depot with four million square feet of covered storage, 200 miles of road, tanks for 118,000 barrels of gasoline, 16 Liberty ship docks, and multiple camps and administrative facilities.[18] For the first time in the SWPA Theater, detailed engineering plans and preparations were made in advance, including a separate engineer annex in the order issued 28 March.[19] On 22 April, the assault by Task Force RECKLESS was made with the largest assemblage of ships, planes, and soldiers ever organized in the SWPA to that date. The engineer component was 41 percent of the 60,000-man total. Most of these engineers came from construction units.[20]

Enemy resistance was virtually nonexistent on D-Day at Humbolt and Tanhmerah Bays.[21] Soon after the infantry units landinged, engineers immediately supported their assaults inland. Combat engineers joined the 41st Infantry Division landings at Humbolt Bay. The 1881st EAB along with the 116th Engineers and the 79th Combat Battalion played a critical role in widening the main trail leading from the beach to Pim, a village

just a few miles to the south of the town of Hollandia. Prior intelligence stated that this was a road in fair condition; however, the road was only a trail that soon bogged down vehicles along swampy portions of the route.[22] Engineer support to the 24th Infantry Division landings at Tanahmerah Bay was more laborious, since the trail that led inland was too narrow for vehicular traffic and supplies had to be hand carried from the beach. As a result of heavy rains, the lack of gravel or rock, and an inadequate number of tools, this trail could not be immediately widened and improved. Nevertheless, the Allies captured all three airfields--Hollandia, Sentani, and Cyclops--by 26 April.[23]

The 931st Engineer Aviation Regimental Headquarters took operational control of the Army engineer units to repair and improve the existing poorly constructed airfields as well as construct many miles of roads, bridges, hospitals, camps, water supply jetties, and several headquarters.[24] These units included not only the 841st, 842d, 865th, and 1881st EABs, but also the 3d Engineers (Combat), 239th Engineer Construction Battalion, 880th Airborne EAB, 477th Engineer Medium Maintenance Company, and the 414th Dump Truck Company. The Regimental Logistics Section operated an Engineer Depot for all construction materials. The Regimental Operations Section prepared general plans for all work, and the unit performing construction prepared details to those respective plans.[25]

These four EAB units faced planning and executing challenges while improving the three existing airstrips. All three runways were of earth construction with inadequate drainage and had been heavily damaged by Allied bombing. The base layer below the earthen surface layer, or sub base, at Sentani was so inadequate that the Japanese had placed the runway surfacing on bamboo matting. The earth surface construction made takeoffs and landings dusty in dry weather and badly rutted following a rainstorm.[26]

Before repairs were started, the drainage to the fields needed improvement. The water table was so high that tractors and carryall scrapers became mired in mud when only excavating a foot deep in the ground.[27] This high water table was due to numerous swamps and streams adjacent to the airstrips. To temporarily alleviate this problem until permanent drainage systems were installed, ditch cutting equipment created a three-foot deep trench throughout the surrounding work area, lowering the ground water level.[28] The EABs could then concentrate on rebuilding the airstrips.

After the initial repairs to the bomb damaged runways and area drainage, the four EABs' main focus was to find suitable rock and gravel for reconstruction. The units found these materials in sufficient quantities nearby in streambeds and quarries. Each battalion initially operated its own rock quarry until the 852d EAB arrived in sector to operate a quarry for all the battalions. The 841st and 842d EABs graded the Sentani and Cyclops runways and placed crushed rock in a layer six inches deep. After compacting the rock, they dampened it and topped it with an asphalt prime coat followed by pure asphalt and limestone chips. The 865th and 1881st EABs surfaced the Hollandia runway with iron ore from a nearby hematite deposit, mixing it with 50 percent micaceous sand.[29] By 29 April, transport aircraft landed on the dry-weather use 4,000-foot runway at Cyclops, and by 3 May the Hollandia 5,000-foot strip was ready for fighters.[30]

When compared to its initial plans for a massive base, Hollandia proved disappointing. Due to its swampy terrain, the runways were not used for bombers; the terrain only accommodated transport and fighter airfields. The unfavorable terrain, as well as poor roads and the unlikelihood of developing adequate harbor facilities at either Hambolt or Tanahmerah Bays, led General James Frink, USASOS commander, to

recommend that a smaller base was necessary and that only enough construction was required to support the next operation. Thus, engineer construction plans were modified with a reduced mission scope. MacArthur reduced the number of constructed airfields from six to three, reduced covered storage to three million square feet, and ordered that facilities support 140,000 instead of 200,000 men. Nevertheless, these requirements were still large, and they required all the engineer unit assets that were task organized to Hollandia to successfully complete them.[31]

Sites better suited for heavy bomber airfields were at Wadke Island, about 125 miles northwest of Hollandia, and the island of Biak, about 200 miles farther west of Wadke. Until these airfields were built, heavy bombers had to continue their operations from the Admiralty Islands, 400 miles east of Hollandia. Hence, these islands were of significant importance to strike at Japanese strongholds in the west. As a result of the immediate need for bomber fields, MacArthur scheduled the Wadke landing for 17 May and the Biak landing ten days later.[32] After a wave of air and naval bombings, Task Force TORNADO, consisting of the 163d Regimental Combat Team (RCT) as well as eight engineer units, began its assault as scheduled.[33]

The 836th EAB was one of the engineer units that participated in the landing and engaged in extensive combat. While Wadke was still under air and naval bombardment, the 836th arrived offshore. The unit came under fire later when it disembarked from its landing craft and several men were wounded. With the most intense fighting only 900 feet away, the engineers set up their perimeter defense along the beach. Fortunately for the engineers, during the next day, the Japanese gave up their organized resistance and the 836th made its way to the Japanese-built airstrip, which was heavily cratered by

Allied bombing. Despite harassment from Japanese infantry, the airstrip was repaired and ready for fighters within 48 hours of the 836th's arrival, or D plus 4 (21 May) and transports and fighters soon arrived.[34] By 25 May when all enemy resistance was destroyed, the 836th EAB proceeded on a regular, continuous schedule to lay coral, seal the runway with bitumen, build taxiways, and enlarge the runway. Significantly, it was from this runway at Wadke, that PB4Y aircraft made the first aerial reconnaissance of the Philippine Islands since early 1942.[35]

Planning for an attack on Biak in May 1944 followed the landing at Wadke.[36] Biak, a coral island with an area of 950 square miles, was one of the Schouten Islands in Geelvink Bay. Its volcanic terrain was rugged, consisting of a coral cliff that paralleled the southern coast up to two miles inland and as high as 300 feet. A coastal shelf ranging from 10 to 50 feet above sea level existed between the beach and the cliff as well as numerous coral reefs offshore. The Japanese had constructed numerous facilities on the island, including the Mokmer airfield, which had a runway 4,500 feet long and about 300 yards from shore. The Japanese were also working on airstrips at Borokoe and Sorido, which were not yet operational. Aerial reconnaissance also revealed an excellent road ten miles in length following the coast from the Bosnek village west to the airfields. This road and the vicinity around this village gave enough room for maneuver forces to land. The beaches at Bosnek were chosen as the landing site with the three Japanese airstrips as the tactical objectives. Task Force HURRICANE, the reinforced 41st Division less the 163d RCT, was given the mission of seizing the airfields.[37]

Instructions for base and airfield construction were vague and the engineering planning staffs were short on time. Colonel Herbert Lauterbach, the task force engineer,

and his rapidly assembled staff quickly identified challenges to the operation such as bringing equipment and supplies on shore over the coral reefs. However, MacArthur's instructions dated 10 May had no engineer annex. Therefore, information on what to build was unclear until 17 May when Colonel David W. Heiman, the commander of the 1112th Combat Group and assistant task force engineer in charge of construction, learned from Sixth Army Headquarters that the engineers would build two airdromes--one for fighters and one for bombers. Biak was intended to be a major air base. To accomplish this, three EABs would arrive and begin work at Biak within the first few days of the operation.[38]

On 27 May, the first assault forces of Task Force HURRICANE reached the southern coast of Biak.[39] The 860th, 863d, and 864th EABs arrived soon after the assault forces. The 864th EAB, commanded by Lieutenant Colonel E. L. Griggs, Jr., disembarked on 30 May hoping to immediately reconstruct the airstrip at Mokmar as a fighter and later a bomber field.[40] Unfortunately for the Allies, the seasoned Japanese garrisons gave fierce resistance against the engineers on the coral cliffs and, for their first two weeks on the island, the unit was forced to unload equipment, dodge shells, build roads and jetties, and carry supplies and water to the infantry. Yet even when the 864th reached the Mokmer airfield, it only worked 12 hours in the first three days because of heavy Japanese shelling or being forced to support the infantry.[41] Since the airfield would not be operational for some time at Mokmer and it was rumored that the Japanese planned to reinforce Biak, General Krueger directed reconnaissance of other sites.[42] The reconnaissance resulted in selecting a small island to the south of Biak, Owi, being chosen as a good site for airfield and base construction. On 6 June, Major General Horace

Fuller, the commander of the 41st Division, ordered the engineers to begin the airfield construction at Owi.[43] Immediately, Company B, 864th EAB began work, and the remainder of the 864th arrived by 11 June.[44]

To assist in construction, the 860th under the command of Lieutenant Colonel Benjamin E. Meadows, and the 863d, under the command of Lieutenant Colonel Raymond J. Harvey, landed at Bosnek on 8 June. The 860th's mission was to help the 864th at Owi, while the 863d's task was to make Mokmer operational in a day and a half. The latter unit's challenge was getting its soldiers to Mokmer under the continual threat of Japanese mortar and artillery fire. General Fuller and Colonel David Heiman, commander of the 1112th Combat Group, concluded that landing craft transports (LCTs) from Bosnek to Mokmer on the night of 9 and 10 June, under blackout conditions, were the best alternative. The unit proceeded under these conditions, landing on a coral reef before dawn. When a six-foot tide came in, most of the engineer equipment was flooded and it needed to be brought ashore. Colonel Heiman, who personally led the first wave of soldiers to the airfield, wrote, "We had to work fast and in the darkness on a strip of beach that was strange to all of us. We were lucky."[45] Unfortunately for the 1112th, again the tactical situation did not permit airfield improvements. The Japanese continued aerial bombardment against the engineers and sprayed them with machine gun fire during a field reconnaissance, forcing the engineers to support the infantry in its drive westward toward Borokoe instead of pursuing the airfield construction mission.[46]

Work on the Mokmer airfield was sporadic from the landing date of 18 June, the date that reinforcements arrived at Biak. When fire on Mokmer subsided on 12 June, the 863d EAB accomplished enough work to allow fighter aircraft to land; however, enemy

resistance emerged the next day, delaying further progress. The aviation engineers again supported the infantry, assisting the combat units in destroying the Japanese in the caves and coral reefs. When Lieutenant General Robert Eichelberger took command of Task Force HURRICANE with his requested reinforcements on 15 June, he was able to force the Japanese out of the airdromes and make them withdraw northward toward the coral cliff. On 18 June, the 863d EAB completed the Mokmer runway, 5,000 feet in length for fighters. Meanwhile, the two other EABs completed a 4,500-foot strip at Owi on the same day, which immediately facilitated emergency landings of several P-38 fighters and a B-25 bomber. By 22 June, aircraft regularly used both airfields and construction continued to progress at Borokoe and Sorido.[47] Although they were initially behind schedule due to enemy contact, the airfields constructed at Biak significantly enhanced airpower in the SWPA. From the Biak airfields, the Allied forces were able to bomb the Philippines for the first time in two years.[48]

In order to ensure MacArthur's SWPA forces were within striking distance of the Philippines, other smaller areas or islands also required capture--Noemfoor, Sansapor, and Morotai. Although these missions were smaller in the engineer construction scope, they were no less important in driving toward MacArthur's initial Philippine objective--Leyte. The general execution pattern for these islands consisted of the following: capture the once-held Japanese area, construct the fighter and bomber airfields, and then build the minor base facilities.[49]

The first of these islands assaulted was Noemfoor--an oval-shaped, densely forested, coral island 15 miles in length, 90 miles west of Biak (see inset in figure 12). MacArthur set the amphibious assault date for 2 July. Task Force CYCLONE, consisting

of the 158th RCT and supporting units, landed as scheduled on the northwestern shore near Kamiri airstrip with very little Japanese resistance. Australian Group Captain William A.C. Dale served as task force engineer. His mission was to oversee the improvement of three existing Japanese airfields--Kamiri, Kornasoren, and Namber--with two engineer aviation battalions and three RAAF airforce squadrons.[50]

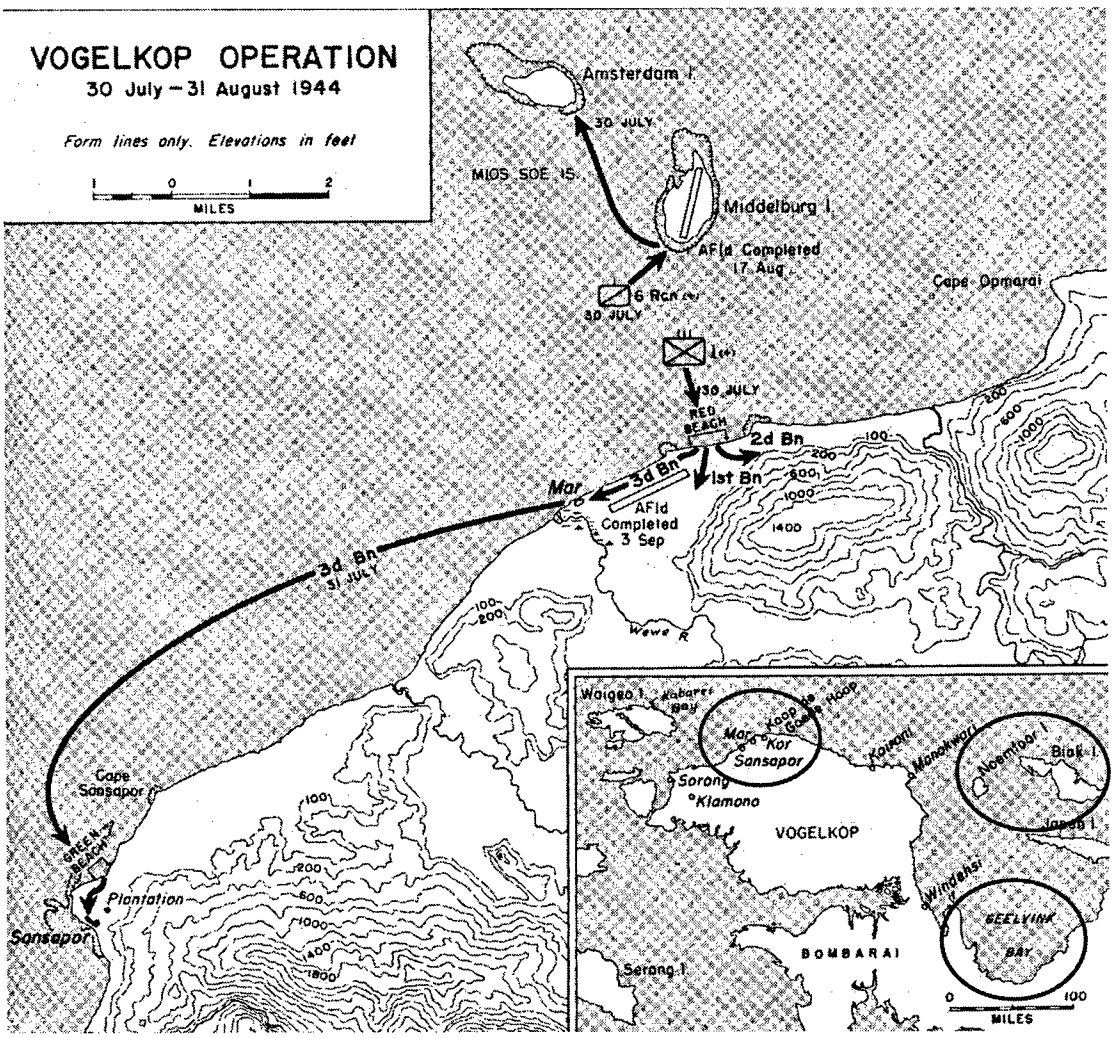

Figure 12. Map of Vogelkop Operation and Geelvink Bay Area
Source: Robert Ross Smith, *United States Army in World War II, The War in the Pacific, the Approach to the Philippines* (Washington, D.C.: Office of the Chief of Military History, 1953), 431.

Initially, the 27th Engineer Combat Battalion arrived with the task of repairing the Kamiri airstrip, filling in bomb craters, and smoothing the runway surface. The 1874th EAB and the 5th Airfield Construction Squadron arrived within a few days to expand the runway to 5,000 feet.[51] The two units had to literally bulldoze their way across the island to allow reconnaissance teams to conduct surveys and soil tests.[52] After two weeks of grading, filling, and compacting a coral base, the fighter airstrip was ready. On 20 July, the Kamiri airstrip had enough facilities to accommodate one fighter squadron.[53]

To the east of Kamiri, engineers completed a partially constructed Japanese airstrip at Kornasoren. The mission expanded to building not one, but two bomber strips 7,000 feet long.[54] Consequently, the engineers fell behind schedule since more filling and grading than originally planned was required.[55] Although the first strip was completed on 25 July, the second bomber strip was not completed until early September. Additionally, the aviation engineers also had to build facilities for a supply of oil and aviation gasoline. This required underwater blasting to erect coral jetties and to construct 16 miles of pipeline, thus slowing the progress. A third airstrip toward the south of the island was begun at Namber, but this location proved unsuitable for anything other than an emergency landing site since the runway could not be lengthened beyond 4,500 feet. Since the surf at Noemfoor Island was so high that ships could not easily off-load there, the island, like Biak, was not developed into a more extensive base.[56]

Concurrently, operations started on Sansapor. On 30 June General MacArthur directed General Krueger to seize the Sansapor-Mar area on 30 July. MacArthur thought that more airfields would have to be built on the Vogelkop Peninsula, the western end of the Dutch New Guinea Island, in order to provide adequate air support for an attack on

the Philippines (refer back to figure 12). The Sixth Army conducted a reconnaissance of the area, including two offshore islands--Amsterdam and Middleburg. Colonel Heiman and his staff, the task force engineer and 1112th Engineer Combat Group commander, concluded from aerial reconnaissance photographs and reconnaissance party information that the combat phase of operations would likely be light, but the construction phase would be challenging. The Middleburg terrain was only suitable for a fighter strip, Amsterdam was too hilly for any landing strip, and the best site on the mainland was a narrow coastal rain forest adjacent to a swamp. Because Japanese resistance was projected to be negligible and the construction work was presumed to be heavy, Casey recommended to MacArthur and Krueger that the engineers and their equipment should be sent at the earliest possible time to begin work.[57]

Eleven additional engineer units were assigned to the task force to complete the formidable construction tasks. Aviation engineers included in this group were the 836th, 1881st, and the 1897th EABs. Their mission included building two airfields--a fighter strip and a bomber strip--in 20 and 35 days, respectively. The engineer units with their equipment were shipped intermittently with combat forces. For example, 30 percent of the 836th EAB arrived on D-Day and 60 percent arrived on D plus 2 (1 August).[58] When the engineers arrived at Cape Sansapor, they were forced to first build a sand jetty at Middleburg, since coral reefs prevented landing craft approaches to shore.[59] On 2 August, the 836th EAB began construction at 90 percent strength on the fighter strip. The soil at Middleburg was sandy and not suitable for a solid base, so the 836th had to dig coral from the ocean floor at low tides, place it on the runway, and compact it to a thickness of four inches.[60] The four companies of the 836th then completed the pierced steel matting,

finalizing the operational field to be known as Klenso.[61] The aviation engineers beat their 20-day deadline by two days, finishing on 17 August.[62] Subsequently, the EAB built storage facilities for oil and facilities for aircraft maintenance as well as improved living quarters. This airbase served as home to the Thirteenth Air Force, which began its air campaign against the Philippines and Borneo.[63]

While the 836th built the fighter airfield at Middleburg, the 1881st and 1897th EABs with other engineer construction units made progress on the Mar Drome, a bomber airstrip. The construction work required on this mainland base was more complex. Since the area was swampy, the units had to lower the water table after carving a runway through the rain forest. The loose, sandy soil contributed to compacting difficulties. Nevertheless, the mission was completed as scheduled on D plus 35 in early September. Factors that contributed to the aviation engineers finishing their airstrip missions at Middleburg and Mar on time were: (1) the decision to send in construction engineers early since light combat was anticipated; (2) the on-time arrival of equipment and units as planned; and (3) command, control, and planning of the 1112th Combat Group Headquarters redesignated as the 1112th Construction Group Headquarters. Colonel Heiman summarized the fortuitous outcome at Sansapor when he stated, "At Sanspor we had the advantages of intensive planning, good units, good equipment, fairly good weather and minimum enemy air interference."[64]

The last of the small islands requiring air facilities in order to launch a strategic attack on the Philippines was Morotai Island in the Moluccas. Since Sansapor was 600 miles from Mindanao, the southernmost major island of the Philippines, it was still too far away to provide sufficient air support for the invasion of Leyte. Consequently,

MacArthur decided to seize one more island, Morotai, located 300 miles from the northwest tip of New Guinea (see figure 13). He set D-Day as 15 September and ordered General Krueger to organize Task Force TRADEWIND--40,000 men consisting of the 31st Infantry Division, 32d Infantry Division, the 126th RCT, and supporting troops.

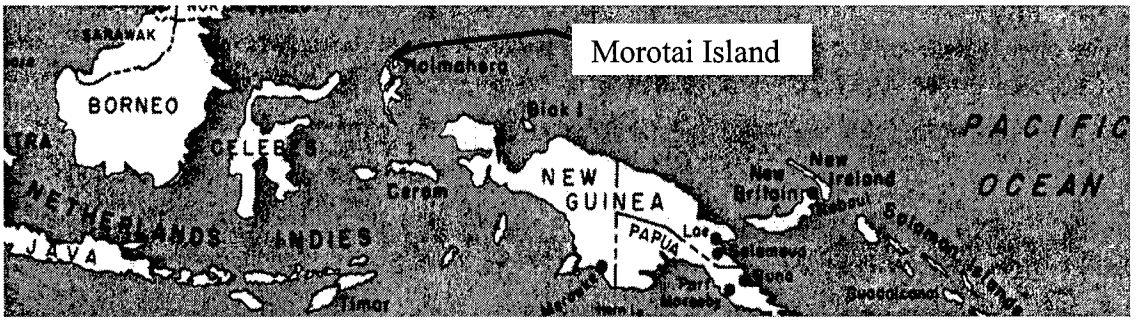

Figure 13. Morotai Island of Dutch New Guinea, 1944[65]
Source: Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers: The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 108.

Terrain on Morotai, similar to the other Southwestern Pacific islands, was mountainous, heavily forested, and contained many surrounding coastal coral reefs. The Japanese had already started and abandoned a runway on a narrow coastal plain. The western shore, protected from the Gila Peninsula, which shielded these beaches from heavy surf, was chosen as the landing site. Unfortunately, planners misinterpreted aerial reconnaissance photographs of this chosen assault site. They misidentified the beaches as being white sand from the photographs. The beaches were actually surfaced with grey mud three feet deep. Additionally, because the coastal water was so shallow, landing craft had to unload far from the shore, which greatly minimized the amount of equipment

offloaded until the landing force engineers built ramps and piers out into the ocean. This landing was characterized as "one of the most difficult in the Southwest Pacific."[66]

MacArthur ordered construction of three runways on Morotai. The first strip, a fighter field, had to be completed immediately, and the other two strips, bomber fields, had deadlines of 10 October and 30 October, respectively.[67] The 931st Aviation Engineer Regimental Headquarters, three EABs--the 836th, 841st, and the 1876th--along with other Army, Australian, and later Navy construction battalions were given the mission to complete these airfields. The 931st and the 1876th arrived on D-Day and the remaining EABs arrived during the next 15 days.[68]

The first task on the 1876th's agenda was to carve out the fighter strip, later to be known as the Wama Drome. On D-Day, the 931st's commander, executive officer, and operations officer reconnoitered the site. They developed a plan to connect Wama Drome with a second airdrome, later to be known as Pitoe, with a taxiway one-half mile long.[69] Engineers faced clearing a jungle with heavy underbrush and deep tree roots. In addition to this debris, 5,000 coconut trees were removed and a drainage system was installed. Despite these difficulties, the 5,000-foot runway, which was later expanded to 6,500 feet, was operational on 3 October with a six-inch layer of coral base and a steel landing mat as its surface.[70] In all, engineers cleared 245 acres, stripped 91,859 cubic yards of grub, and placed 550,000 square feet for the Wama Airdrome.[71]

Next, the 836th began work on the first of the two bomber strips, named Pitoe Field, in an area just north of the fighter strip. These two runways were to have lengths of 8,000 feet long.[72] Again, many trees were cleared and the silty clay topsoil was stripped to the coral sub layer, but far more material was removed than anticipated. After much

cutting, filling, and compacting, Pitoe Field was completed on 17 October with a pierced steel plank surface. By 31 October, the second bomber runway was 90 percent complete. In addition to these runways, the engineers also provided: two storage facilities for 40,000 barrels of aviation gasoline, a fuel jetty, two floating wharves, a pile dock, camps, hospitals, and access roads. [73] Remarkably, engineers cleared 1,500 acres, stripped 339,700 cubic yards, and used 54,000 gallons of a dust palliative for surfacing upon completion of Pitoe Airdrome.[74]

Engineers ran into difficulties building the two bomber strips, which resulted in missing MacArthur's deadlines. They missed the 10 and 30 October dates because of: (1) new location requirements since the existing Japanese site was not suitable, (2) the time required to obtain enough coral for the runway base, (3) shortages of spare parts that could not render inoperable equipment operational; and (4) the staff's ambitious planning schedule.[75] Nevertheless, engineer construction at Morotai "acquired the reputation of being the most efficient engineering job ever conducted in the SWPA to that date."[76] The operation at Morotai was the last of the New Guinea campaign.

By October 1944, MacArthur was in striking distance of the Philippines. The engineers' role grew significantly during the New Guinea campaign, and MacArthur recognized this when he stated in 1944 that war in the SWPA "was an engineer's war."[77] By mid-1944, the SWPA had 31 EABs, six airborne EABs, and two regimental headquarters in theater.[78] Overall, by 1 October, there were 100,000 engineers in the Southwest Pacific Theater--54 percent of all American engineers fighting against Japan.[79] One third of all engineers were in Netherlands New Guinea.[80]

Allied forces were firmly rooted along the New Guinea coast, Biak, and nearby islands, facing the same issues as in 1942 and 1943. The key task at this point was the construction and expansion of airfields and bases at those respective Allied strongholds in preparation for the Philippines invasion. As in the previous two years, the war in the SWPA created logistical support issues such as the proportion of combat engineer assets to construction assets. Soldier shortages continued to force reorganization of units, while supply problems and spare part shortages increased.

Since the general terrain of islands in the Southwest Pacific either consisted of rugged mountains or jungle in its interiors and narrow coastal beaches, conditions in the SWPA were quite different from what was originally thought when pre-war planning took place. Staffs based their original engineering planning on the European theater of World War I; a theater quite different from the Pacific Theater in terrain, climate, and culture. Engineer units--combat and combat support--in the SWPA had to carve airfields and bases out of raw jungle at the greatest possible speed.

Consequently, there existed little distinction among the combat, combat support, and logistical phases of each operation for engineers since extensive construction had to be completed during the combat phase of operation. One estimate stated that of the divisional combat engineering efforts along the New Guinea coast, only ten percent was devoted to combat, while the other 90 percent was dedicated to construction.[81] The major tasks were basically the same throughout each operation: building airfields and bases. Colonel Sturgis illustrated this point when he wrote in September 1943, "As usual, the Engineers up here are way out front. That's what makes this war so different."[82] Since the war in the SWPA was a "war of bases" and how fast those bases were built, task force

commanders, particularly those in Sixth Army, were not only responsible for combat operations, but were also responsible for starting work on air and supply facilities.[83] Brigadier General Hugh Casey, GHQ SWPA Engineer, believed that giving task force commanders the responsibility for beginning base construction was "definitely the correct procedure under the conditions which prevailed in the Southwest Pacific."[84] Essentially, aviation engineers and traditional construction engineer units received much needed assistance from combat engineering units.

Soldier shortages and unit reorganizations continued throughout 1944. The most acute engineering unit shortage was among heavy construction units. As previously mentioned, combat engineer units were forced to do construction jobs, tasks for which they were neither trained (until they received on-the-job training) nor equipped (until they received the appropriate equipment from the War Department). In addition, many nondivisional engineer combat and camouflage units were reorganized as construction units. To quickly fill in some units, some men from the infantry and artillery branches were transferred to depleted engineer units. Furthermore, MacArthur's decision not to give the Army Air Force command and control of aviation engineers paid dividends since task force commanders placed engineer battalions in forward areas to perform whatever construction work was urgent. In a letter to the Commandant of the Engineer School, a major from the Sixth Army engineer section staff wrote, "Aviation battalions have built docks, combat battalions . . . airdromes, and Seabees have built army headquarters."[85]

Finally, disease contributed to reduced troop numbers. On Owi, for example, the 864th EAB suffered 64 cases of scrub typhus and three men died from the disease.[86]

Many also fell sick with various tropical fevers. These were just some of the personnel strength issues and solutions that emerged in 1944.

As a result of the challenges to fill personnel strengths to adequate levels, airfield construction standards had to be modified. A certain amount of risk was assumed in military construction that would have not been acceptable in the civilian sector. Sverdrup pointed this out when he stated, "Military engineering as opposed to engineering in civilian life must assume certain risks in the all-important and prevailing interests of speed of construction and lack of materials."[87] By 1944, standardized procedures and specifications for airfield construction were prevalent. Those experienced EAB units that had been in the SWPA the longest did not even require standardized designs; they knew how to get the job done in the best way almost automatically.

The overall construction specifications usually followed this pattern. First, the task force engineer and the local air force commander selected a forward base site. In New Guinea and the surrounding islands, there generally existed two types of terrain in which to place the airfield--the lowlands near the sea and the lands a little farther inland, or bench lands. Coconut groves were the best sites in the lowlands since they allowed for the best drainage. The bench lands were also well drained and level, usually covered with kunai grass. Transports immediately landed on these areas once grass, boulders, and trees were removed.[88]

Second, once built, the field consisted of one strip or two parallel strips with hardstands, alert areas, and the minimal amount of operational facilities. If only one strip was constructed, a parallel taxiway was inserted next to it. For fighters, a base course was required as well as a surface of crushed rock, gravel, and sand. Bombers necessitated a

more extensive surface. One such surface was bitumen consisting of two or more coats thinned with diesel oil placed on top of a base of compacted sand and gravel mixture or coral. Other surfacing material was the steel mat, especially if the likelihood existed that the field was temporary. Whatever base or surfacing material was employed, engineers had to plan for adequate drainage so that the runway would not fail in heavy or extended rains.[89]

Third, the option of using an existing Japanese airfield also existed. However, these fields usually offered more disadvantages than advantages. Most of the fields were poorly constructed and were rebuilt since their sub bases could not accomodate heavy U.S. aircraft. They were also usually too short. However, pursuit planes could usually land on them after one to two days' worth of improvements were made. Extensive work over one or two weeks was required for planes heavier than the C-47.[90]

To increase facility construction speed, prefabricated buildings of wood were erected with standard widths of 20, 44, or 88 feet. To reduce the amount of lumber, smaller structures were combined and interior posts were used to support the roof. Corrugated metal served as roofs, and usually gravel was used as flooring. Native buildings of vines, palms, and kanai grass were also employed as shop buildings, but they were not utilized as warehouses because of the fire hazard. Hospital buildings started out using canvas material or native structures, but this plan was abandoned since canvas could mold or rot and the native structures sometimes contained ticks that transmitted typhus. Consequently, hospital wards were transferred to prefabricated buildings. Prefabricated buildings saved aviation engineers and other construction units considerable time and materials.[91]

On the occasions that aviation engineers built wharves, piers, or docks, construction generally followed standardized designs and procedures. The U.S. Navy provided pontoon wharves as engineers built wooden wharves and the pontoon wharves were moved forward to the next requirement when the wooden ones were completed. As an example of a specification, a structure, 300 feet by 30 feet, was positioned parallel to the shore for Liberty ships. Material sets were shipped from rear bases. Units with sawmills supplied lumber for docks. In addition to these tasks, engineers also constructed jetties, crib wharves for barges, and improved sites for landing craft.[92]

Again, as in 1942 and 1943, aviation engineers faced shortfalls in supply, although some improvements were incorporated. The War Department changed its policy regarding the supply levels that units were required to have on hand. Since previous stockage levels were unrealistic, class II and class IV items were reduced from a 90-day operating level and a 90-day reserve to a 30-day operating level and a 120-day reserve.[93] Plentiful supplies included fortification materials, hand tools, and steel landing mats. Australia provided about 25 percent of engineer stocks including cement, lumber, construction materials, prefabricated buildings, and some equipment. However, mass shortages still existed in corrugated iron, lumber, electric and welding supplies, nails, and bolts due to shipping backlogs from the U.S. On 1 May 1944 in the U.S., there existed a 300,000 ship-ton backlog and 32,000 ship-tons piled up in Australia at the end of May. This was mainly due to the lack of docking and unloading facilities at U.S., Australian, and New Guinea ports.[94] One source wrote, "Supply channels were so choked that irregular methods alone got results."[95]

Since there were no central supply depots in the SWPA, supply distribution problems continued until new theater-wide procedures for requisitioning and distributing emerged. At the start of 1944, no engineer headquarters or office had overall oversight of supply types and quantities. By February, the Engineer Branch of Distribution Division was created and operated at Sidney, Australia and a Distribution Branch was positioned at Milne Bay, New Guinea to supervise supply distribution. Although understaffed, with only 30 personnel, this organization began the formidable task of creating a file index of hundreds of thousands of stock control cards. By March, the division grew to 20 officers and an Australian civilian staff of 89, however, operations declined when the Australian government would not permit its civilians to work in a new consolidated position at Oro Bay, New Guinea.[96]

Spare part shortages and distribution of those spare parts in the SWPA also continued as issues in 1944. This was due in part to the multiple manufacturers of equipment as well as a shortage of soldiers trained in stocking and distributing parts. The first parts supply company arrived at Milne Bay in January 1944 and a second one came to Finschhafen, Northeast New Guinea, in April. These units processed 8,000 cases of parts and set up a spare parts depot. In May, 44 major equipment items lacked spare parts. Casey wrote to Brigadier General Raymond Fowler, Assistant Chief of Engineers for Supply, on 6 June: "The statement that parts for all important items . . . are critically short or nonexistent is not an exaggeration. It is not a question of keeping stocks within prescribed levels but of reaching and maintaining a satisfactory operating level."[97]

To alleviate the distribution problem, some measures were taken. More and more parts were shipped via air. For example, in June 1944, 650 tons of parts were shipped by

water and 50 tons were flown in air transports.[98] Also, a plan was implemented to provide "floating warehouses" on ships by November to speed up distribution to forward areas.[99] Although these solutions slightly mitigated the distribution problem, they could never completely overcome the vast distances that parts had to travel from the U.S. and within SWPA.

In spite of the lack of construction units, supply shortages, and spare parts distribution problems, the Allies had the momentum during the New Guinea campaign as they surged toward the Philippines. From December 1943 to September 1944, the aviation engineers not only participated in ten major landings, but also facilitated and enhanced tactical and strategic air power for the air forces and supported ground combat units in driving the Japanese out of their respective areas. The aviation engineers were the primary means to rapidly construct the bases required for MacArthur to fulfill his promise.

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[8]John H. Dudley and William G. Staggs, "Engineer Troops on Airdrome Construction," *The Military Engineer* 37, no. 240 (October 1945): 386.

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[14]Ibid.

[15]Wesley C. Craven and James L. Cate, eds., vol. 7, *Services Around the World, the Army Air Forces in World War II* (Washington, D.C.: Office of Air Force History, 1983), 284.

[16]Dod, 527.

[17]Craven and Cate, 284 and Fowle, 364.

[18]Dod, 527.

[19]Ibid., 529.

[20]Ibid.

[21]Ibid., 530.

[22]Ibid., 531.

[23]Ibid.

[24]Dudley and Staggs, 386.

[25]Ibid., 386-387.

[26]Ibid., 387.

[27]Ibid.

[28]Dod., 532.

[29]Dudley and Staggs, 387.

[30]Dod, 532.

[31]Ibid., 534.

[32]Ibid.

[33]Ibid., 534-535.

[34]Ibid., 536.

[35]Craven and Cate, 284.

[36]Ibid.

[37]Dod, 537.

[38]Ibid., 537-538.

[39]Ibid., 538.

[40]Ibid., 539.

[41]Craven and Cate, 285.

[42]Fowle, 362.

[43]Dod, 539.

[44]Ibid.

[45]Ibid., 540.

[46]Ibid.

[47]Ibid., 540-541.

[48]Craven and Cate, 286.

[49]Dod, 561.

[50]Ibid., 561-562.

[51]Ibid., 562.

[52]Craven and Cate, 286.

[53]Dod, 563.

[54]Ibid.

[55]Craven and Cate, 286.

[56]Ibid.

[57]Dod, 564.

[58]Ibid., 565.

[59]Craven and Cate, 286.

[60]Dod, 565.

[61]Ibid.

[62]Craven and Cate, 286.

[63]Ibid., 286-287.

[64]Dod., 565-566.

[65]Ibid., 108.

[66]Ibid., 566-567.

[67]Ibid., 568.

[68]Dudley and Staggs, 388.

[69]Ibid.

[70]Dod, 568 and Dudley and Staggs, 388.

[71]Dudley and Staggs, 389.

[72]Ibid., 388.

[73]Dod, 568.

[74]Dudley and Staggs, 389.

[75]Dod, 568.

[76]Craven and Cate, 288.

[77]Fowle, 363.

[78]Ibid., 364.

[79]Dod, 569.

[80]Ibid.

[81]Ibid., 543.

[82]Ibid., 542.

[83]Ibid.

[84]Ibid., 543.

[85]Ibid., 547.

[86]Ibid., 541.

[87]Ibid., 549.

[88]Ibid.

[89]Ibid., 550.

[90]Ibid.

[91]Ibid.

[92]Ibid., 551.

[93]Ibid., 554.

[94]Ibid.

[95]Craven and Cate, 288.

[96]Dod, 556-557.

[97]Ibid., 558.

[98]Ibid.

[99]Ibid.

CHAPTER 6

ENGINEER AVIATION UNITS IN THE PHILIPPINES AND SHAPING THE FINAL MONTHS OF THE WAR, 1945

As early as 1943 prior to the conclusion of the New Guinea Campaign, General MacArthur's staff had already begun planning for the Philippines invasion. The capture of the Philippines was of strategic importance because it would greatly contribute to severing Japanese lines of communication and providing a support base for invading Japan. On 12 March 1944, the Joint Chiefs directed MacArthur to formulate a precise plan for attacking the southernmost Philippine island, Mindanao, beginning on 15 November 1944. Originally, MacArthur planned to return to the islands on 25 October starting with a small-scale attack on Sarangani Bay on the southern coast of Mindanao. The attack on Mindanao would be followed by a major amphibious attack against Leyte in the central Philippines, where an extensive base would be built to support an attack against Luzon. Luzon would be the most important base area built by aviation engineers to support the invasion of Japan in November 1945.[1]

As a result of Admiral William Halsey's progress making numerous carrier strikes on the central and southern Philippines from 10 to 14 September 1944, MacArthur moved his assault schedule earlier. Halsey reported to Admiral Chester Nimitz, the Pacific Ocean Area commander, that the area "was wide open."[2] Japanese resistance to Allied fliers was weak and enemy strength was overall significantly depleted throughout the archipelago area. On 14 September, Halsey also recommended an immediate attack on Leyte. Nimitz forwarded this recommendation to the Joint Chiefs, who in turn, asked MacArthur if he could speed up attacks as Halsey suggested. MacArthur replied in two

days that he could, and consequently, the Joint Chiefs ordered the attack on Leyte moved up to 20 October (see figure 14 for general locations).[3]

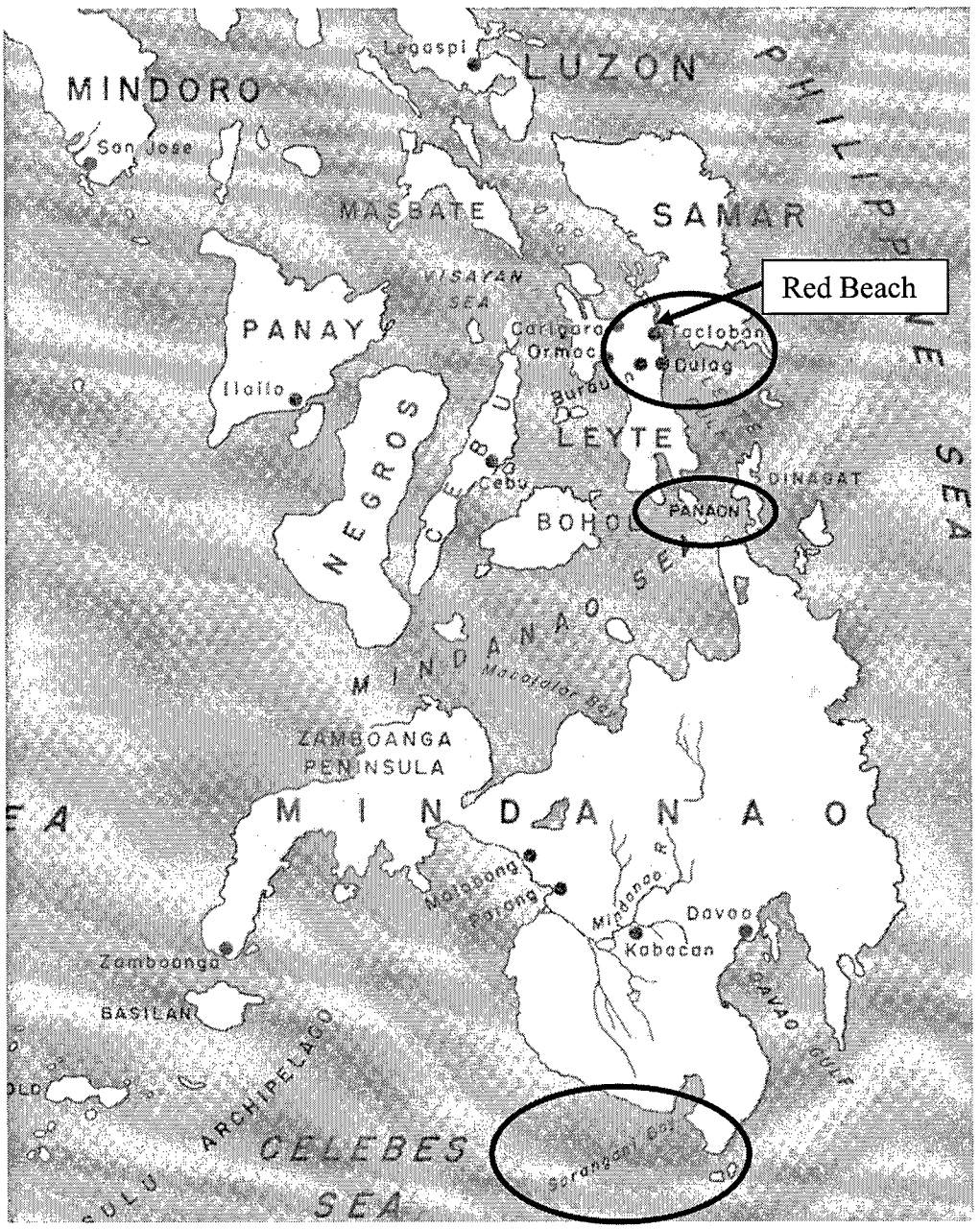

Figure 14. The Philippines, 1944-1945
Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 574.

In order to provide necessary logistical support for the upcoming invasion in October 1944, the Army Service Command, ASCOM, was created. Lessons learned from the New Guinea Campaign showed that the often ad hoc or hastily assembled task force engineer staffs could not successfully confront problems that arose, especially those issues that emerged in construction and supply. ASCOM was initially formed at Brisbane, Australia, on 23 July 1944 with Major General Hugh Casey in command and Colonel Leif Sverdrup as MacArthur's acting chief engineer for GHQ SWPA. Prior to the assault on 20 October 1944, ASCOM was transferred to Sixth Army, so that no time was lost in providing engineering combat support or in starting base and airfield construction. Casey reported directly to General Krueger, the Sixth Army commander, and divided ASCOM into two subordinate commands--Construction Command to build the bases and airfields and Base K (Leyte) Command to administer facilities.[4] Of the 37,000 engineer troops in SWPA, 14,000 were initially assigned to ASCOM. Aviation engineers along with other construction units were assigned to ASCOM as they arrived from the rear area of operations or from the U.S.[5] Eventually, Casey's Sixth Army Service Command would reach a strength of 21,097 engineers (47 percent of the ASCOM force) which included 15 aviation battalions, three construction battalions, two port construction and repair groups, and seven dump truck companies.[6]

Even with the newly formed ASCOM to address construction and logistical issues, Casey was not without initial planning difficulties for the Leyte operation. The first problem was the lack of available time. The target date was moved up 60 days to 20 October instead of the 20 December date as MacArthur last dictated in August 1944. The new objective area was now 350 miles further away than Sarangani Bay--600 miles north

of the Morotai airfields and 1,000 miles northwest of the Biak airfields. Clearly, Leyte was beyond fighter and medium bomber range, making this operation particularly risky without land-based air support; air support would be carrier-based until airdromes were constructed locally. Engineers had to have airfields ready as soon as naval air support was withdrawn. To complicate matters, the landings would be made during the northeast monsoons, October through April, when rains fell on the eastern side of the mountainous islands. Most of the early construction would have to take place during October and November--the months of the strongest winds and typhoons. Finally, little was known of Leyte's current terrain, particularly man-made features, since land-based reconnaissance planes still could not range from the most forward bases. Halsey's carrier fleet had taken pictures, but clouds obscured important terrain features and subsequent pictures were not better.[7] These obstacles made planning difficult.

Although there existed little current information about Leyte, the eighth largest island of the archipelago, there was some knowledge on the island obtained through the United States Coast and Geodetic Survey from studies prior to the war. Leyte, a mountainous and heavily wooded island, was 115 miles long, 43 miles wide in the north, 32 miles wide in the south, and 16 miles wide in the center.[8] It had two valleys, Leyte Valley and the Ormac plain, which were generally not suited for construction because of numerous streams and rice paddies. Most of the roads, very few of which were paved, were located in the northeast, stemming from Tacloban, the capital. Additionally, uncertainties existed about the number of existing airfields and their condition. Planners speculated that the prewar 5,000-foot commercial airfield just two miles from Tacloban was operational. Four pre-war fields were in central Leyte (Dulag, San Pablo, Bayug, and

Buri). Most of the island's population resided in small villages or on farms. Brigadier General Samuel Sturgis, Jr., the Sixth Army Engineer described Talcoban as "merely an overgrown village with a few dilapidated warehouses and public buildings and limited berthing facilities for two ships."[9] Similar to most previous operations, the engineer staff would not only be challenged with improving limited existing facilities with outdated information, but they would also have to make critical decisions in a limited time period.

ASCOM prioritized construction completion in four phases: airfields, base facilities, wharves, and other critical facilities. The first concern was the number of airfields to construct. Planners determined that four airfields would be required. The first runway, 5,000 feet in length, had to be ready within five days of the first landing.[10] Of the airstrips in Central Leyte, only San Pablo was to be developed into a bomber strip.[11] Engineers would improve the other two strips to accommodate fighters and transports. The second priority was providing a base within 30 days for 200,000 troops to include port and floating dock facilities, warehouses, hospitals, and headquarters buildings for various units. Next, the staff determined that six wharves were necessary for Liberty ships, each wharf taking two ships, as well as 17 jetties. The first wharf needed to be finished in 45 days. Finally, ASCOM had to provide 12,000 hospital beds, two small fuel jetties, and bolted tanks with a capacity of 2,000 barrels each. To accomplish these tasks, ASCOM staff had less than one month to obtain, load, and divert critical supplies on transports to Leyte.[12] Due to this tremendous scope of work, there was no doubt that aviation engineers would construct more than airfields.

Operationally, the plan consisted of two major landings on the island's east coast. The X Corps, composed of the 1st Cavalry Division and the 24th Infantry Division, was

to land on the beaches south of the Cataisan Peninsula and north of the Palo River near Tacloban. The XXIV Corps, consisting of the 7th and 96th Infantry Divisions, was to land near Dulag (refer back to figure 14 for general locations). One RCT of the 24th was to land on Panaon Island, southeast of Leyte, to secure the narrow strait. Since the early capture of the Tacloban airdrome and the four other fields in central Leyte was essential, the major assaults had to be made near these two areas. On 20 October 1944, or A-Day, the landings were made as planned.[13]

ASCOM's first and most important task--building airfields--began as soon as possible after the landings, since American forces were without land based air support and the Japanese fleet was operating in Philippine waters. The existing strip at Tacloban was the first field to receive engineer construction assets. The 1881st EAB joined the 46th and 240th Construction Battalions on A plus 3 (23 October) to improve the strip for fighters by A plus 5. In order to take bombers, the strip would eventually have to be realigned ten degrees and lengthened to 6,000 feet since it was located on the narrow, mile-long Cataisan Peninsula.[14] After overcoming the challenge of moving equipment and thousands of tons of supplies that LSTs dumped on the already existing runway from Red Beach, these units worked continuously under Japanese air attacks to emplace the coral base for the steel mat surface. [15] On A plus 5 (25 October), the enemy frequently bombed the engineers. Sturgis, who arrived on shore on A plus 1, wrote, "The sky was notably devoid of our own fighters, but Zeros and Bettys were whizzing down from the low overcast like hornets."[16] There was a large naval battle off the coast of Leyte; dozens of U.S. planes made emergency landings on the unfinished strip as some carriers were sunk or disabled off the southeast coast of Samar.[17] Working through the night, the

Tacloban strip was completed by the evening of A plus 6 (26 October) with a steel mat surface and dispersal areas for fighters.[18]

Meanwhile, engineers began construction work on the airfields in Central Leyte after the Dulag airstrip was captured on A plus 2 (22 October) and the other three strips were captured during the next five days.[19] Initially, the 808th EAB, who landed on A plus 3, had the formidable task of reconstructing the Dulag Field, which was located in the center of rice paddies and swamps.[20] For a stable base, engineers had to place many layers of sand and gravel from a nearby streambed. Two days later, nearly 50 navy fighters made emergency landings on the incomplete airstrip since they could not return to their carrier.[21] Although the 821st EAB arrived on A plus 7 (27 October) to assist the 808th, airfield reconstruction progress was severely hampered by heavy rains and flooding.[22] The rainy season had arrived and the entire airfield area was a mass of mud. The gravel pit used for base material was submerged in mud and it was clear that Dulag Field was not going to be completed on time. In fact, fighters did not land on this field until mid-November.[23]

Since U.S. forces lacked air support, the Japanese were able to send reinforcements to Ormac. General Kenney had agreed to take over air responsibility from the U.S. Navy on A plus 7, even though he had no planes on Leyte and no adequate bases to stage them at that time. Fortunately, when the U.S. committed its reserves, it repelled any decisive enemy resistance, and the Leyte campaign proceeded as planned even though it was prolonged. These were the ill-effects when the aviation engineers could not complete their mission on time due to lack of proper planning, terrain, and weather.

Efforts continued to build and improve airfields on Leyte in November, but the realization came that the construction deadlines for the three strips west of Dulag--Bayug, Buri, and San Pablo--were out of the question due to the enduring, heavy rains. About twice of Leyte's average amount, 35 inches of rain fell in the first 40 days of the campaign.[24] Additionally, a typhoon with winds ranging from 60 to 70 miles per hour struck the beachhead and harbor on 8 November.[25] The roads were impassable. Consequently, airfield construction in Central Leyte was abandoned late in November.[26]

With only two all-weather fields operational at Tacloban and Dulag, another one was immediately needed. The only ideal site remaining was near the town of Tanauan, eight miles south of Tacloban. Tanauan, which was positioned on a beach, had good drainage. However, two complications existed: (1) the southern end of the proposed field was close to a hill 250 feet high; and (2) Headquarters, Sixth Army already occupied the site. Starting 28 November, General Krueger moved his headquarters and three EABs worked 18 continuous days to remove jungle growth, add and compact coral, and lay a steel mat surface.[27] The Tanauan airfield, with a runway length of 6,000 feet proved to be an important runway.

Airfield construction was only a small portion of engineer work on Leyte. Those aviation engineers who remained on Leyte after follow-on missions at Mindoro and Luzon were completed also participated in construction of roads, port facilities, oil storage tanks, hospitals, stockades, depots, and other buildings. By 18 December, six fixed and four floating jetties were in operation and one floating and one fixed dock for Liberty ships had been constructed. At Tacloban, engineers completed a temporary storage system for gasoline consisting of a 500-barrel tank on the shore, which was

connected with a pipeline to a barge offshore.[28] Later, a permanent storage tank system was constructed which included storage tanks for 11,250 aviation gasoline, 5,500 barrels of motor fuel, and 5,500 barrels of diesel fuel as well as associated pipelines and jetties. Tank farm systems were also installed at Tanauan and Dulag. Aviation engineers also contributed to ASCOM's efforts to provide 13,500 hospital beds in tents. They continued the major task of widening and maintaining 100 miles of road. The amount of work that EABs devoted to miscellaneous construction tasks on Leyte foretold the ways in which engineers were used in the Philippines campaign; more than half of the aviation engineer work effort in this campaign was devoted to construction unrelated to building airfields.[29]

Prior to the Luzon landing, MacArthur determined that he would seize the island of Mindoro to develop the airdromes near the city of San Jose concurrently with the airfields on Leyte. Since Leyte had only two operational airfields for land-based aircraft, Mindoro would remedy any shortfalls going into the Luzon campaign. An RAAF airfield construction squadron and three EABs joined unopposed landing forces on 15 December to construct an airstrip on the southwestern side of the island.[30] The location of the airfield was suitable--good soil not saturated with moisture--since it was during the dry season.[31] Within five days, the engineers readied the 5,700-foot airstrip, Hill Field, for fighters. The timing of completion proved fortuitous because when the 8th Fighter Group had just arrived on the island, they immediately repelled a Japanese air attack.[32]

Allied forces would not be so fortunate when aviation engineers began work on an additional all-weather field at San Jose. Work was interrupted when the Japanese fleet fired shells on the runway and gasoline storage tanks. Destruction of this fuel as well as other logistical issues delayed the Luzon landings for an additional three weeks.

Nevertheless, the 7,000-foot airfield at San Jose was completed on 28 December and supply issues were resolved.[33] The Mindoro fields provided more adequate air support facilities for the Luzon invasion.[34] Overall, the tactical airfield construction proved substantial by the close of 1944. Allied engineers had built no fewer than 65 airfields since 1942 (refer to figure 15).

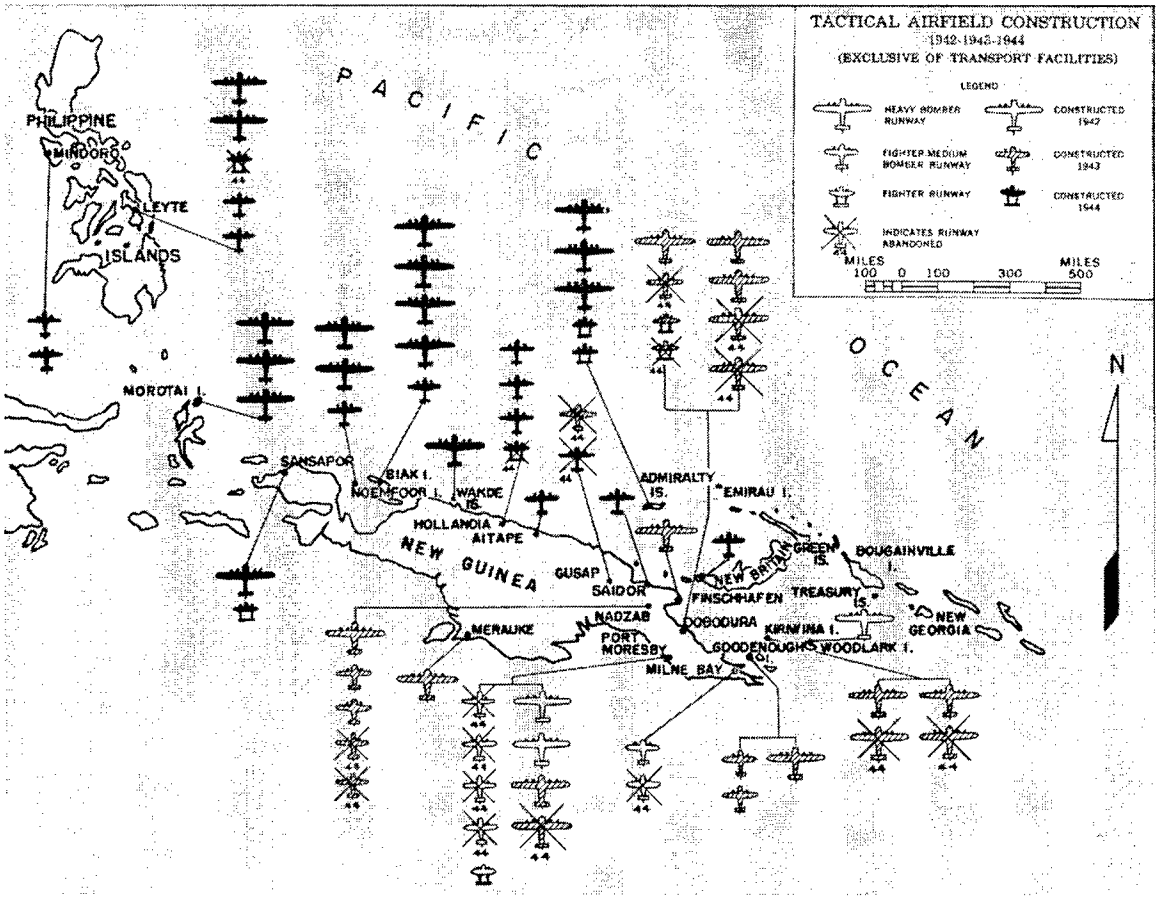

Figure 15. Tactical Airfield Construction
Source: George A. Meidling, ed., *Engineers of the Southwest Pacific 1941-1945,* vol. 1, *Engineers in Theater Operations* (Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, 1947), 226.

After Leyte was turned over to the Eighth Army, General MacArthur readied for the Luzon attack. Known as the M-1 operation, the Allies set their commencement date to drive toward Manila on 9 January 1945. Over 250,000 soldiers consisting of Sixth Army's I Corps and XIV Corps along with augmented units would participate. This was the largest Pacific joint operation of the war to that date. The Allied Philippine campaign of 1945 would be the 1941 Japanese campaign in reverse.[35]

In contrast to the landing at Leyte, engineers would have more favorable weather, terrain, and existing facilities. The Sixth Army Engineer Section's staff began their planning on 19 September with the assumption that the assault landings would be made at Lingayen Gulf and that Allied forces would drive toward Manila down the Central Plains. Since the western side of the central Luzon range, the Central Plains, had its dry season from November to mid-May, construction would not have to be done during heavy rains; dust would be the main concern. Lines of communication, such as roads, were adequate. However, bridging was a concern due to the number of water obstacles that units would have to cross in the vicinity of the assault area--Lingayen Gulf and the Central Plains toward Manila.[36] 25 airfields were estimated to be in the Central Plains, yet only one field, Clark Field, was believed to have all-weather surfacing. The others were thought to be for dry-weather use only.[37] An airfield was planned at Lingayen with a temporary 5,000-foot long runway to be completed within six days after the landing as well as another all-weather strip to be finished within 15 days.[38] Nevertheless, conditions on Luzon seemed favorable overall (refer to figure 16 for geographical locations).

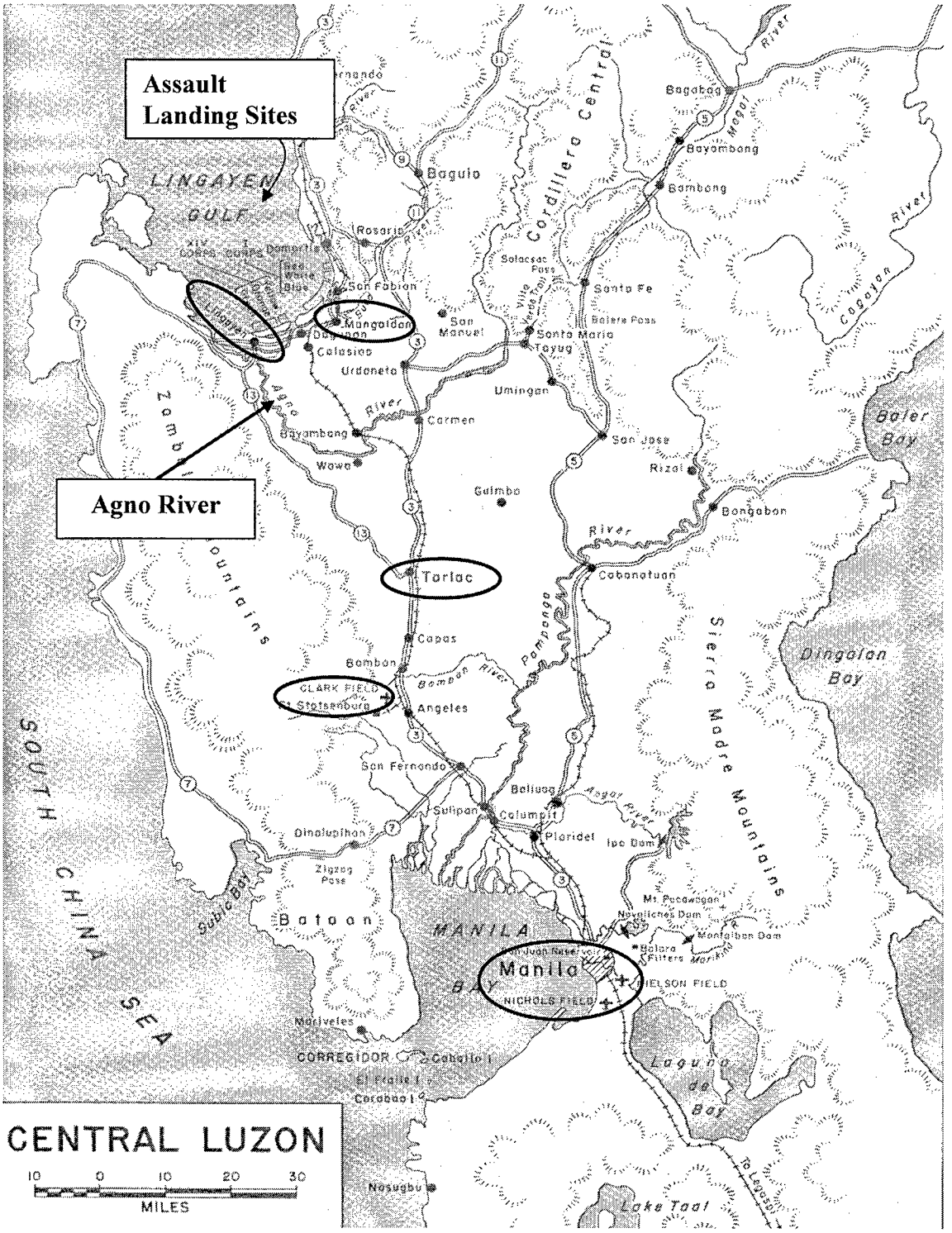

Figure 16. Central Luzon

Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 591.

Since aircraft carriers were only available for seven days, an airfield needed to be constructed within five days of the landing.[39] To rapidly accomplish aviation engineering missions, ASCOM had nine EABs while Brigadier General Sturgis, the chief engineer of the Sixth Army, employed six EABs plus the 5202d Construction Brigade.[40] ASCOM's function was to serve as the Sixth Army's construction agency for the first 30 days of the operation. The first priority was to start the Lingayen airstrip. 400 Filipinos were immediately employed to make emergency repairs such as filling bomb craters on the damaged Japanese strip.[41] On 13 January 1945, the 836th EAB arrived along with the 1879th EAB and the 43d Construction Battalion to smooth out the surface, cover it with palm fronds, and place the steel matting. The runway was ready for the Fifth Air Force by 16 January.[42] ASCOM's engineers were off to a good start and consequently their accomplishments freed aircraft carriers to return to the Pacific Fleet.

ASCOM aviation engineers also built two other strips during the first two weeks of the operation. Engineers chose one site at Mangaldan, a rice paddy, on 17 January and the 1876th EAB made it serviceable for bombers in five days.[43] Meanwhile, the 841st EAB rebuilt the former Japanese strip at Mabalacat.[44] Unlike on Leyte, the rapid construction of these airfields due to favorable weather conditions enhanced the tactical situation; maneuver combat units were already advancing south to Clark Field.

A great portion of aviation engineers' accomplishments on Luzon, however, were not building or refurbishing airstrips, but rather in repairing lines of communication and rehabilitating cities. Aviation engineers, particularly the five EABs task organized to the 5202d Engineer Construction Brigade, built runways and semi-permanent bridges. They often repaired spans with timber trestle or they used Bailey bridging for large structures'

missing sections. The 841st, 863d, 1876th, and 1913th EABs repaired rail bridges at various locations to ensure that the first railway supply trains entered Manila. By 29 January, the railroad opened from Lingayen Gulf to Tarlac.[45] Additionally, units such as the 1876th and 1879th EABs participated in Manila's rehabilitation, block by block, as soon as the city started to be free of Japanese defenders on 6 February 1945.[46] With other specialty construction units, their mission included floating bridge installation, clearing streets, rehabilitation and operation of municipal water and electrical systems, fighting fires, and leveling unsafe buildings. They worked to restore and repair the water supply and the electrical systems first. An immense amount of effort was required to overcome the destruction caused by the Japanese as well as from the fighting to retake the city.[47]

Probably the most extensive airfield repair completed by the 5202d Engineer Construction Brigade was Clark Field's concrete runway. Within a week after its capture in the last week of January 1945, it was again in use. Not only was the airfield patched up for fighters and transports, but engineers also developed a 7,000-foot runway with a soil-stabilized sub grade and an asphalt surface in just ten days. The capture and rehabilitation of Clark Field, as well as the smaller airfields of Nichols, Neilson, Floridablanca (formally Del Carmen), and Porac, was necessary to sustain operations on the Philippines for the Sixth and Eighth Armies' follow-on missions for Operation VICTOR.

Aviation engineers continued to support Eighth Army's missions in the central and southern Philippines--Palawan, the Zamboanga Peninsula, and the Visayan Islands. Capture of these islands not only secured the entire Philippines, but bases in these regions would prepare for the future seizure of Borneo and control the inland water passages connecting the Sulu Sea with the Visayan and Mindanao Seas.[48] The first landing was on

28 February 1945 at Palawan (refer to figure 17).[49] The 1897th EAB and other engineer units accompanied the landing force, the 186th RCT of the 41st Division, on the eastern shore of the island. Japanese resistance was minor, and the island was almost immediately brought under Allied control. The engineers repaired the badly damaged airstrip at Puerto Princesa, and in 19 days, it was ready to receive fighters.[50]

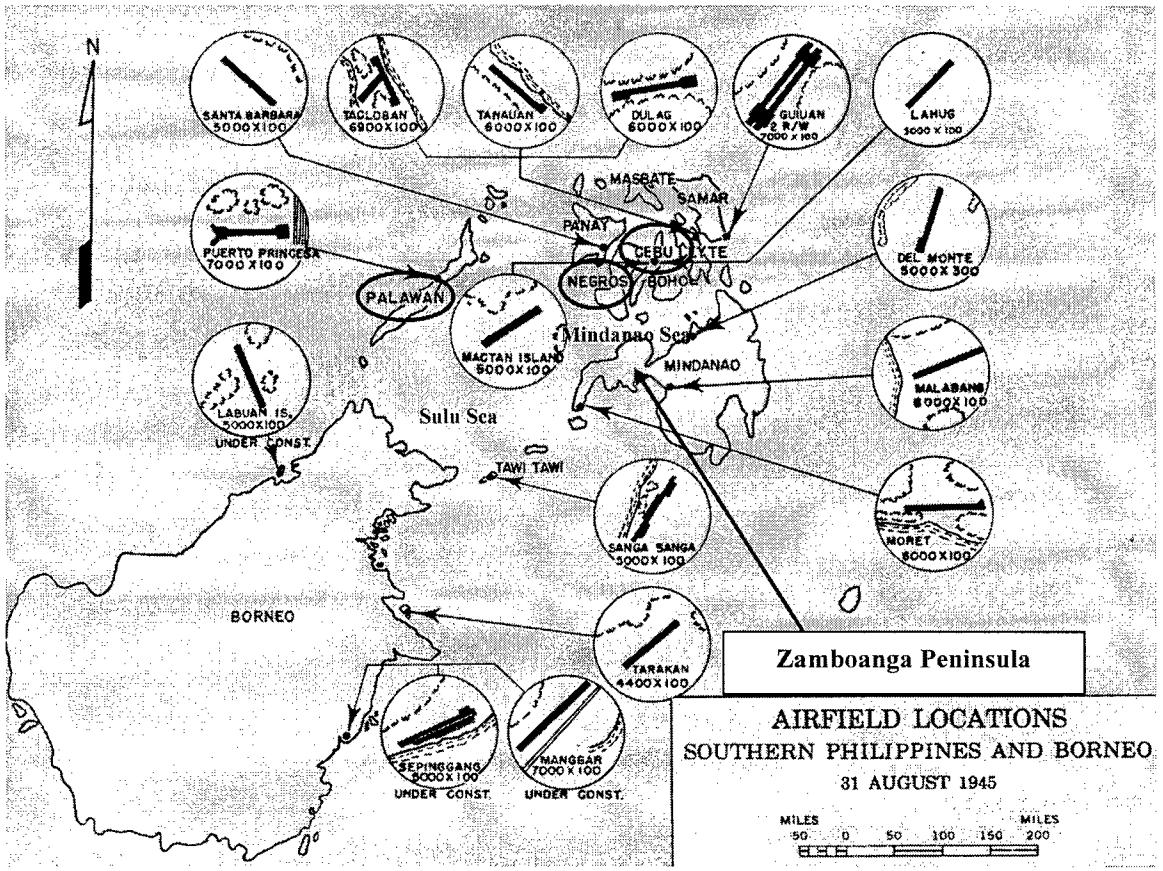

Figure 17. Airfield Locations in Southern Philippines
Source: George A. Meidling, ed., *Engineers of the Southwest Pacific 1941-1945,* vol. 1, *Engineers in Theater Operations* (Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, 1947), 314.

On 10 March 1945, the Eighth Army, particularly elements of the 41st Division, assaulted the Zamboanga Peninsula and the Sulu Islands, and subsequently, the engineers repaired several airfields. The Zamboanga Peninsula was 150 miles in length extending from an isthmus on the western portion of Mindanao. The Sulu Islands, about 370 of them, were tiny islands extending from the southwest of Mindanao to Borneo. The three most significant islands were Basilan, Jolo, and Tawitawi. Again, enemy resistance was light, and the 873d EAB rehabilitated airfields on the peninsula as well as on the Sulus.[51]

Beginning 18 March 1945, elements of the 40th Division and the Americal Division seized Panay and Western Negros as well as Cebu, Bohol, and Eastern Negros, respectively. The 865th EAB joined other engineer units to provide major engineer support beginning 18 March 1945. Similar to Palawan and the Zamboanga Peninsula, air and naval bombardment drove the enemy away from the beaches and sent them retreating to the island's interior. Cebu City was nearly deserted. Again, the 865th EAB assisted with road and bridge building and also improved airfields and other facilities.[52]

The Eighth Army continued its attacks throughout the Southern and Central Philippines to include the major portion of Mindanao as well as the neighboring island of Borneo. As a result of the airfields on these islands, the Allies sustained operations against the Japanese throughout the enemy's organized resistance, which lasted until 1 July 1945. Even then, the Eighth Army had to conduct mop-up operations until the end of the war to clear out over 65,000 remaining Japanese soldiers on Luzon. Nevertheless, the Allies had captured the enemy's crucial oil supplies on Borneo and cut off Japanese lines of communication with the Netherlands East Indies.[53]

While the campaign pressed on in the Philippines, aviation engineers from the Southwest Pacific also contributed to operations in the Pacific Ocean Area--Iwo Jima and Okinawa. The two theaters--Southwest Pacific and the Pacific Ocean Areas--were jointly responsible for the final assault on Japan. In the first six months of 1945, construction focused on building bases and developing airfields in the Philippines as well as on Okinawa and Iwo Jima, which would support the final attack against the Japanese home islands. Engineers either built or repaired a total of 45 runways in the Philippines, four on Okinawa, and three on Iwo Jima. Construction in other areas was either minimized or eliminated. These two islands were important for supporting air requirements as well as base facilities for the ground invasion of Japan (Operation DOWNFALL).[54] However, plans for Operation DOWNFALL never materialized because the Japanese sued for peace on 10 August 1945 after atomic bombs were dropped on Hiroshima and Nagasaki on 6 and 7 August, respectively.[55]

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[1]Karl C. Dod, *United States Army in World War II, The Technical Services, The Corps of Engineers*: *The War Against Japan* (Washington, D.C.: Office of the Chief of Military History, 1966), 570.

[2]Ibid, 572

[3]Ibid.

[4]Ibid., 571-572, 579.

[5]Wesley C. Craven and James L. Cate, eds., vol. 7, *Services Around the World, the Army Air Forces in World War II* (Washington, D.C.: Office of Air Force History, 1983), 288.

[6]Barry W. Fowle, ed., *Builders and Fighters: U.S. Army Engineers in World War II* (Fort Belvoir: Office of History, 1992), 380.

[7]Dod, 572-573.

[8]S.D Sturgis Jr., "Engineer Operations in the Leyte Campaign, Part I." *The Military Engineer* 39, no. 265 (November 1947): 459.

[9]Dod, 574.

[10]Ibid., 575.

[11]Ibid., 580.

[12]Ibid., 575.

[13]Ibid., 576-577.

[14]Ibid., 579.

[15]Craven and Cate, 289.

[16]Dod, 580.

[17]Ibid.

[18]Craven and Cate, 289.

[19]Dod, 580.

[20]Craven and Cate, 289.

[21]Dod., 581.

[22]Ibid.

[23]Craven and Cate, 290.

[24]Dod, 586.

[25]S.D Sturgis Jr., "Engineer Operations in the Leyte Campaign, Part II," *The Military Engineer* 39, no. 266 (December 1947), 517.

[26]Dod, 583-584.

[27]Craven and Cate, 290.

[28]Dod, 585.

[29]Craven and Cate, 291.

[30]Dod, 586.

[31]Craven and Cate, 291.

[32]Ibid.

[33]George A. Meidling, ed., *Engineers of the Southwest Pacific 1941-1945,* vol. 1, *Engineers in Theater Operations* (Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, 1947), 227.

[34]Dod, 587.

[35]Ibid.

[36]Ibid., 588.

[37]Ibid., 590

[38]Ibid., 591.

[39]Ibid., 588.

[40]Fowle, 386.

[41]Craven and Cate, 291.

[42]Fowle, 386.

[43]Dod, 600.

[44]Craven and Cate, 292.

[45]Dod, 602-605.

[46]Fowle, 390.

[47]Ibid., 391.

[48]George A. Meidling, ed., *Engineers of the Southwest Pacific 1941-1945,* vol. 6, *Airfield and Base Development* (Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, 1951), 374.

[49]Dod, 632.

[50]Ibid., 633.

[51]Ibid.

[52]Ibid., 634.

[53]Ibid., 637.

[54]Ibid., 675.

[55]Ibid., 678.

CHAPTER 7

CONCLUSION

In order to shorten the distance from forward operating bases to Tokyo, Japan, the Allies had to accomplish tactical gains through air, naval, and land forces prior to the strategic bombings of the Japanese home islands and the invasion planned for November 1945. In the Southwest Pacific, these gains were made gradually by tactical fighters and medium range bombers in support of MacArthur's island hopping strategy. The U.S. Army aviation engineers who built the bases for these aircraft made this possible.

MacArthur observed, decided, and acted faster than the Japanese forces could respond. One can argue that the war in the Southwest Pacific was a war of bases. Progress toward Japan depended on how fast engineers could build bases and airfields. Allied forces executed a pattern of seizing enemy held territories as they fought their way north from Australia to the Philippines: conduct air and naval bombardment, land the assault forces, defeat any Japanese units in the area, and construct airfields and base facilities.[1] Army aviation engineers rapidly constructed these airbases for land-based aircraft to continue the pattern and reduced the dependence on navy carrier aircraft so that they could protect Allied naval vessels.

Many factors contributed to the Army aviation engineer units' successes. The first of these was the aviation unit organizational structure. Expanding from 24 officers and 687 enlisted men in October 1941 to 33 officers and 774 enlisted men in May 1944, engineer aviation battalions were designed to perform independently and build airfields rapidly.[2] They contained more and heavier equipment than any other engineer battalion and were designed with enough personnel to work in two to three shifts in a 24-hour

period. On the other hand, the Japanese primarily used inexperienced and often malnourished slave labor for airfield construction with primitive equipment and hand tools. Although lacking experience and expertise at times, the Army's school-trained soldiers and professional engineer officers as well as engineer equipment--the dozer, scraper, dump truck, and pierced steel plank matting--proved superior to that of the enemy.

The next factor that gave MacArthur a decisive advantage was the ability to incorporate the efforts of the Allied forces, particularly the Australians, sister services, and native laborers. The Australian civilian workforce provided the Army much needed labor at USASOS supply depots and the Australian Commonwealth provided many critical supplies to U.S. forces, as well. With the combined efforts of Australian workers, the Royal Australian Engineers, and U.S. engineers, more than 300 airfields were completed on Australia alone. Navy Seabees also worked side by side with army units, building airfields and airbases across the Southwest Pacific from Australia to the Philippines. Additionally, thousands of native laborers on numerous islands in the vicinity of New Guinea, Leyte, and Luzon helped to accomplish the often-formidable scope of engineer work for airstrip and base construction. These native workers freed the army engineers to perform the more technically or tactically challenging tasks. Aviation engineers could have neither accomplished their missions nor could MacArthur have achieved successful execution of his island hopping strategy without the combined efforts of these contributors.

Another factor of Allied success was MacArthur and his engineer staffs' abilities to adapt. For example, the shortage of aviation engineers and construction units, in

general, was mitigated by the ability to modify existing units and construction methods. Unfortunately, pre-war planners based their engineer planning concepts on the European Theater of World War I--not the jungles of the Southwest Pacific. The demand for construction tasks exceeded the demand for combat engineer support and, consequently, more construction-type units were required. When calls for aviation or construction engineer units outpaced calls for divisional combat engineer units, combat units were transformed to construction units or were tasked to do construction missions. Changes in equipment were also made to units when deficiencies arose during mission execution. When the leadership learned in 1943 that the airborne aviation engineers' equipment was too light to remove heavy jungle, the airborne aviation engineer units were converted to heavy engineer aviation battalions by 1944. These were just a few examples of engineer organizational modifications.

Prewar construction practices were largely abandoned because they were too time consuming. Elaborate bases with intersecting concrete runways and camouflage were eliminated. Concrete runways took too much time to build; bitumen or steel mat surfacing was just as effective using a strong material, such as indigenous coral or gravel as a sub base. If multiple runways were built, they were built parallel to the prevailing wind direction; perpendicular runways or runways that crossed took too much space and wasted precious time clearing land. Finally, camouflage proved ineffective and too time consuming. The best technique was to rapidly finish the airstrip so that Allied fighters could take off and engage enemy aircraft. These were just a few of the construction technique changes that aviation engineers incorporated.

Throughout the war, aviation engineers also had to overcome numerous challenges. They often did this through sheer will and creativeness. The first was inadequacies in supply, repair parts, and supply distribution. Requisitions for supplies and parts took far too long. In most cases, it took a requisition anywhere from 180 to 360 days to be filled. Shipping allocation for engineers from the U.S. or Australia was given a lower priority or percentage than required. Often, supplies failed to have manifest labels, which slowed the process. The shipping distance itself was a huge factor as well as the lack of adequate ports between Australia and forward operating bases to accommodate the number of ships. Supplies and spare parts that did make it to the Southwest Pacific Theater often were not distributed in a timely manner since they lacked a theaterwide stock control system and personnel trained to run the depots. Fortunately, engineers overcame some of these deficiencies, especially in obtaining spare parts, through parts fabrications or improvisation and adaptation of existing parts.

Another challenge that engineers had to face was how to best assign engineer units to various commands. The Army Air Force wanted exclusive control of aviation engineers; however, control remained with USASOS. Only when MacArthur intervened in the debate between Kenney and Casey did this issue get resolved in Casey's favor. Since there was too much work with too few engineers to do it, this decision proved beneficial to the engineer corps and to the entire Southwest Pacific Theater. Many units other than engineer aviation units worked on airfields, and aviation units performed dozens of tasks outside of airfield construction such as road building, bridge repair, facility construction, port construction, and fighting as infantry.

Finally, aviation engineers had to survive the weather, disease, and the terrain which some have said were a more ferocious enemy than the Japanese. These engineers faced intense heat, heavy rains, and strong winds. They knew when the weather and terrain had overpowered them and they cut their losses, as in the case of abandoning airfield construction on Hollandia and Leyte. Thousands of soldiers succumbed to skin diseases and various fevers creating great personnel shortfalls in some units. Aviation engineers pushed themselves and their equipment to the limits--20 plus hours a day, seven days a week for months without a break--clearing the heavy jungle terrain and building through rice paddies and swamps.

In spite of all of the logistical, command and control, and environmental challenges, aviation engineers accomplished their mission. In only two notable instances--Hollandia and Leyte--did aviation engineers and planning staffs deviate from their original mission scope, yet they still found alternate solutions to fulfill MacArthur's operational goals. By the start of the Philippines Campaign in October 1944, aviation engineer units were highly proficient in airfield building and repair. They were so adept and experienced that they did not even require construction plans from their higher headquarters. In a few days or even hours, aviation engineers transformed a poorly constructed Japanese strip into a quality airfield ready for U.S. fighters and transports. In days or weeks, these units carved an airbase out of raw jungle.

As a result of the supporting airbases in the Southwest Pacific, namely the Philippines, the Allied air and ground offensives continued against Japan until 2 September 1945. Japanese forces were destroyed in New Guinea, the Philippines, Borneo, Iwo Jima, and Okinawa. Engineer aviation forces were combat multipliers in the

Southwest Pacific Theater, building more than 200 airfields from Australia to Japan from 15 February 1942 to 15 August 1945.[3] About 120,000 officers and enlisted soldiers served as aviation engineers in early 1945.[4] If the war had continued a few months longer, 93 total engineer aviation battalions would have served in the Pacific Theater.[5] The army's aviation engineers played their largest role in the Southwest Pacific and facilitated MacArthur's efforts at the strategic, operational, and tactical levels. Their contributions made his island hopping strategy both possible and a success.

Aviation engineers of World War II set precedence for engineers of the 21st century. World War II was the groundbreaking war for rapid, tactical airfield construction. Many current tactics, techniques, procedures and tools for building airstrips are similar to those of 1942 through 1945. Modern army engineers are still refining this function with sister services as the Joint Rapid Airfield Construction (JRAC) initiative. Likewise, engineers in the contemporary operating environment are faced with the same challenges (logistics, command and control, multi-faceted missions, and the environment) that aviation engineers faced during World War II and comparable to these past engineers, 21st century engineers are adapting and determined to accomplish their missions. Today's army's engineers are truly echoing the aviation engineers' spirit to shape and sustain tactical, operational, and strategic objectives on the modern battlefield.

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[1]Karl C. Dod, United States Army in World War II, The Technical Services, The Corps of Engineers: The War Against Japan (Washington, D.C.: Office of the Chief of Military History, 1966), 542.

[2]*Table of Organization and Equipment, No. 5-415, Engineer Aviation Battalion,* (Washington, D.C.: War Department, 15 May 1944).

[3]George A. Meidling, ed., *Engineers of the Southwest Pacific 1941-1945,* vol. 6, *Airfield and Base Development* (Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, 1951), 422.

[4]Barry W. Fowle, ed., *Builders and Fighters: U.S. Army Engineers in World War II* (Fort Belvoir: Office of History, 1992), 351.

[5]Wesley C. Craven and James L. Cate, eds., vol. 7, *Services Around the World, the Army Air Forces in World War II* (Washington, D.C.: Office of Air Force History, 1983), 308.

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