

## PANAMA IN WORLD WAR 2 – THE COAST ARTILLERY MINES

When thinking about protection of the Canal as it was being constructed it seemed logical that this would primarily consist of large calibre coastal artillery, to deter and engage enemy warships. They would be supplemented by searchlights, protective nets, mines, and smaller calibre weapons for close-in defence. After all, this was the formula also used to defend vital parts of the coast of the Continental US. When the Canal opened in 1914, aircraft were not any sort of threat, and even by the end of World War 1 they could still not be considered the main threat.

As in the US, it was the Army and its Coast Artillery Corps, that was responsible for the defence of the terminals at either end of the Canal and, by extension, the Canal itself. By the 1930s, the advances being made by naval aviation meant that the threat to the Canal and the other important installations had changed out of all recognition to that of just over 20 years earlier. The big guns were still seen to have a role, but the chief concerns were of an air attack (especially after the attack on Pearl Harbor) – although sabotage was also seen as a real danger.

The main role of the large guns was to keep enemy vessels at a distance, out of the effective range of naval guns of the time. The bombers of the US Army Air Corps (USAAC) were intended to serve a similar function, detecting, and attacking enemy naval formations before they got into a position to threaten the Canal. However, with aircraft carriers an attacker could stand off at far greater distances, outside the range of the biggest guns, and providing a much more elusive target for even the searching bombers and patrol aircraft to find. By World War 2, the Coast Artillery Corps also had an anti-aircraft role, with searchlights<sup>1</sup>, sound detectors<sup>2</sup> and guns, with four regiments dedicated to the role in the Canal Zone in December 1941. However, many of the main artillery batteries lacked protection from the

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<sup>1</sup> Searchlights were also employed in support of the gun batteries of the harbour defences, particularly where submarine or small craft attacks were involved, and in conjunction with the smaller calibre weapons.

<sup>2</sup> Until radar became available and adapted for the anti-aircraft role, which was an evolution which took place during the war, sound-ranging batteries were organised for the purpose of detecting and determining ranges by observation of sources of sound.

air, particularly those housing the 16-inch (406 mm) mortars, making them highly vulnerable.

The Corps also controlled the submarine mines, being responsible for the operation and maintenance of controlled submarine mine fields laid in the defence of the harbours. These remained relevant throughout the war in a way that the large calibre coastal artillery did not. In the US, while several Harbor Defense Commands (the local command in charge of the defences) were disarmed and disestablished between World War 1 and World War 2 (though not that in the Canal Zone), their minefield defences had often been retained.<sup>3</sup>

When the US entered World War 1 in 1917, the coastal defences of the Canal had been under what was called the Panama Coast Artillery District, a part of the Coast Artillery Corps. In 1920, with the rundown of US forces after that war, the Canal Zone harbour defences were redesignated as a Coast Artillery district within the Panama Canal Department – the equivalent of an Army Corps that was responsible for the overall defences.

In 1924, Coast Artillery Corps units were redesignated as regiments, with the 1<sup>st</sup>, 2<sup>nd</sup> and 4<sup>th</sup> Coastal Artillery Regiments<sup>4</sup> being those in the Canal Zone. A regimental organisation was expected to improve morale by enhancing unit identification.

In 1925, what had formerly been known as Coast Defense Commands had been renamed Harbor Defense Commands<sup>5</sup>, and in the Canal Zone, there were two Commands, one based on Balboa and the other on Cristobal.

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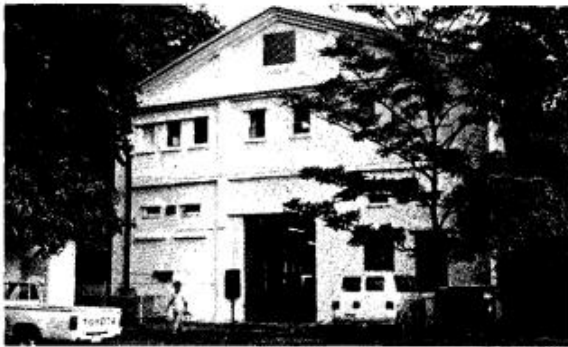
<sup>3</sup> <https://www.globalsecurity.org/military/facility/coastal-forts-ww2.htm>

<sup>4</sup> These adopted the historic lineage of artillery regiments abolished in an earlier reorganisation in 1901.

<sup>5</sup> <https://cdsg.org/wp-content/uploads/pdfs/FORTS/CACunits/CACorg2011.pdf>

### THE COAST ARTILLERY CORPS

In 1939, it was said that the Coast Artillery Corps includes all fixed artillery, all anti-aircraft artillery, all railway artillery, all tractor-drawn artillery especially assigned for coast-defence purposes, all controlled submarine mine installations, and all subaqueous sound-ranging installations, together with the searchlights, power plants, communications, trains, and other accessories necessarily incident to the maintenance and tactical employment of these weapons. It consists of units of the Regular Army, of the National Guard, and of the Organized Reserves. Its mission was to attack enemy naval vessels by means of artillery fire and submarine mines and to defend against enemy aircraft by means of fire from the ground.<sup>6</sup>



*Mine Storehouse Building #359, Naos Island*

### THE ARMY SEA MINES

As we have seen, under US law, the defence of harbours and the US sea coast (including overseas outposts, such as the Canal Zone) was the responsibility of the Army. One of the methods used to protect harbours was to lay minefields. However, unlike the minefields of open water, employed by the Navy, the Army relied on what were termed “controlled minefields”. The US Army used controlled buoyant mines to defend US harbours from the 1880s until World War 2, and some 4,000 controlled mines were used during the period 1943-1945.<sup>7</sup>

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<sup>6</sup> <https://cdsg.org/wp-content/uploads/pdfs/FORTS/CACunits/CACorg2011.pdf>

<sup>7</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

## Definition of a Controlled Mine (TM 2160-20, 1930)

*“A controlled submarine mine, as employed by the United States Army, was a watertight steel case, containing explosive and a firing device, with a means for control of fire by electrical connection to shore. The case was of such size that it was held at a predetermined depth by the length of mooring rope that was attached to the anchor which retained it at the location at which planted”.<sup>8</sup>*

In 1939, official guidance<sup>9</sup> explained that –

*“A submarine mine battery is an administrative and fire unit of the harbor defense and is employed for the installation, maintenance, and operation of a controlled mine field. It is divided into a battery headquarters section, an operations section (containing a command-post detail and a range detail), a casemate section, a loading and property section (consisting of loading, cable, explosive, and maintenance details), a planting section (consisting of mine planter, distribution-box boat, and small boat details), and a maintenance section. In addition, fire-control and gun sections may be included for manning certain of the mine defenses, or the loading and planting sections may have an additional assignment as gun sections. The battery officers include a battery commander, an executive, a casemate officer, and a loading officer”.*

A 1930 manual laid down the functions of the mines –

- the destruction or serious damage of hostile vessels which approach within effective range;
- to supplement the offensive action of other weapons in repelling hostile attack;
- to prevent the close approach or entry into a harbour of hostile surface vessels under cover of night, fog, or smoke, when by reason of the invisibility of the ships from shore, other weapons are wholly or partially ineffective;

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<sup>8</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

<sup>9</sup> R.O.T.C. Manual, Coast Artillery, Basic, 11<sup>th</sup> Edition (Revised), (Military Service Publishing Company, Harrisburg, PA. 1939): <https://cdsg.org/wp-content/uploads/pdfs/FORTS/CACunits/CACorg2011.pdf>

- to limit or prevent the navigation by hostile naval submarines of channels or water areas;
- to restrict the freedom of manoeuvre of hostile naval vessels in formation;
- by the morale effect of an unseen threat, to enforce a constant element of caution and uncertainty in the planning and execution of all hostile naval operations within the water areas known or believed to be protected by mine fields; and
- to give warning of hostile submarine activities or of the presence of hostile surface vessels.<sup>10</sup>



*This prewar postcard includes mines being “planted”*

Rather than being detonated merely by contact, Army minefields were connected to the shore via a series of electrical cables. Main cables from shore went to a junction box, with each junction box typically supporting 19 mines.<sup>11</sup>

One of the obvious advantages of a controlled minefield was that a shipping channel could be completely mined, and yet still remain usable for friendly shipping.

<sup>10</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

<sup>11</sup> DC current was used to monitor and test the mines, as well as signal to the shore that contact had been made. AC current would then be used to detonate the mine.

The minefields were composed of both contact mines, similar to conventional naval mines, and controlled mines such as the M4 Ground Mine which had a 3,000 lb (1,360 kg) TNT charge. The contact mines would be placed in areas barring all vessels entry, and the controlled mines in designated channels. The mines could be fired individually or as a group.



Coast Artillery Mine Planter Device, authorised by War Department Circular 25, dated 17 January 1920.<sup>12</sup>

Establishing an effective controlled minefield involved a large investment in infrastructure. The minefield would only be “planted” (as we shall see, this term was used by the Army for laying down a minefield) when hostilities were imminent and hence storage and maintenance facilities ashore would be needed. There would also be the observation and control posts for operation of the mines, and planting and maintaining the minefield (as well as accompanying nets, buoys etc) required vessels and manpower.

Typically, a mine storage shed would hold the mine itself. A separate magazine would be built to hold the explosives for the mine. Provision also had to be made for putting the mines in place, with wharves for the “mine planting” ships, tramway tracks to facilitate movement of the mines from storage to the wharf, and storage for many miles of electrical cable was needed, in addition to other specialised equipment and facilities. If electricity supplies were not available, power generation facilities would also be needed.

For each defended harbour, one or more of each of the following was required<sup>13</sup> –

- a mine casemate to house power and control equipment;
- a mine storehouse for storage of the empty (unarmed) mines and other equipment;
- a loading room for assembling and arming the mines;
- a magazine to store the explosives;
- a cable tank for the storage of cables under water;

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<sup>12</sup> [https://warrantofficerhistory.org/Hist\\_of\\_Army\\_WO.htm](https://warrantofficerhistory.org/Hist_of_Army_WO.htm)

<sup>13</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

- a mine wharf where loading of the planter vessels would be loaded;
- a rail track connecting the mine storehouse, magazine, cable tank and mine wharf;
- a mine group commander's station and plotting room;
- base end stations – for observing and plotting targets' movements etc;
- mine planting and maintenance vessels (including regular and auxiliary planters, distribution box boats and motor yawls – see below for an explanation of these terms);
- position-finding equipment (including observation instruments for the base end stations, the mine group commander's plotting board, a predicting device, stopwatch, telephones, and telephone lines)<sup>14</sup>;
- searchlights – to illuminate the minefield at night; and
- “rapid-fire guns” (90 mm in the Canal Zone) to protect the minefield (and counter small craft).

Army controlled minefields could generally be fired in one of three ways –

- by command;
- by contact; or
- by delayed contact.

### **Command detonation**

This was controlled by a central control (known as the mine casemate) which would send the signal to detonate a particular mine. The control centre also needed communications to observation stations, as well as plotting tables and plotters to track any enemy and decide which mines to detonate etc. As well as the observation stations, for night firing, searchlights were used to track and illuminate targets.

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<sup>14</sup> As with the big guns, the Coast Artillery units could triangulate a target's location using two observation stations and, by sightings at timed intervals, could predict the track and future position of the target. This procedure, known as “position-finding”, was used in the Canal Zone, with permanent observation bases at either end of a measured base line some thousands of yards in length. The observation bases would be equipped with powerful optical azimuth instruments, with the observation bases linked to the control by telephone.

### **Contact detonation**

Where visibility was impaired for some reason, the minefield could be set to fire on contact, much like a traditional minefield. As mentioned, some contact mines could also be deployed to bar any entry into specific areas.

### **Delayed contact**

This involved the mine itself served as a sensor, telling the control centre when contact had been made – so that the commander could then order detonation after a few seconds delay (which had advantages by means where the damage to a ship might be caused). This method also allowed the mine commander discrimination in his targets, so that he could ignore a small scouting vessel in favour of a better target, for example.

As a safeguard, Army controlled mines used direct current for operation, supervision, and signalling, but used alternating current for all firing. When a mine was fired, either by command or contact, alternating current was sent though the selectors to the mine. Without the alternating current, the mines could not be detonated.<sup>15</sup>

Controlled mine fields were limited to distances not exceeding 10,000 yards (9,144 metres) from the shore and to depths not greater than 250 feet (76.2 metres). The effective range was 2,000 yards (1,828 metres) from the channel mouth inner limit, 8,000 yards (7,315 metres) from the outermost searchlight locations, with a minimum depth of 20 feet (6 metres), and a maximum depth of 250 feet (76.2 metres). The maximum current in the channel could not exceed 3 knots (3.4 mph, 5.5 kmh).<sup>16</sup>

When the attack on Pearl Harbor took place on 7 December 1941, the US Army had approximately 5,000 moored, controlled mines in stock and 1,200 mines in defensive minefield projects had already been planted. In early 1942, all defensive minefields were completed in a number of important ports - San Francisco, Portland, Boston, Narragansett Bay, New York, Chesapeake Bay, Portsmouth – as well as at both Cristobal and Balboa in the

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<sup>15</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

<sup>16</sup> Ibid.

Canal Zone.<sup>17</sup> During the war the Army would sow 7,320 mines (3,569 contact and 3,751 magnetic) domestically along with 1,847 mines outside the US, including in the Canal Zone.<sup>18</sup>

In 1943, a newer generation of magnetic detection mines were installed to replace the older contact type mines. These new mines would signal the control station if a ship of over 1,000 tons passed over any mine.<sup>19</sup>

Also in 1943, the mine defences in the Canal Zone were increased. In June 1943, when the mortars were removed, Battery Carr at Fort Grant, which helped guard the Pacific entrance to the Canal, was converted into a mine casemate. It supported an additional 10 mine groups. Battery Tidball at Fort Randolph at the other end of the Canal was also similarly converted as a mine casemate for another 10 mine groups.<sup>20</sup>

## THE MINE PLANTERS

The US Army had what was called the Army Mine Planter Service (AMPS), dating back to 1918<sup>21</sup> (replacing the use of civilian-manned vessels used since 1904<sup>22</sup>) and which lasted until 1954. AMPS was responsible for laying the minefield. The Service came under the Coastal Artillery Corps and installed and maintained all underwater minefields forming part of the US coastal defences – including those in the Canal Zone. The vessels used to deploy the mines (or “sow” a minefield) were called “planters”, rather than minelayers (the term that a navy may have used).<sup>23</sup>

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<sup>17</sup> <http://www.maquetland.com/article-phototheque/14543-mines-warfare-mine-sous-marine-m3-buoyant-mine-fort-miles>

<sup>18</sup> <https://laststandonzombieisland.com/2024/01/22/those-wacky-army-sea-mines/>

<sup>19</sup> <http://www.maquetland.com/article-phototheque/14543-mines-warfare-mine-sous-marine-m3-buoyant-mine-fort-miles>

<sup>20</sup> *The American Defences of the Panama Canal* by Terrance McGovern (Nearhos Publications, 1999).

<sup>21</sup> An Act of Congress established the Army Mine Planter Service as part of the Coast Artillery Corps; and implementation of the Act by the Army was published in War Department Bulletin 43, dated 22 July 1918.

<sup>22</sup> The new Service assumed duties performed by the Artillery Corps in general since 1901 and, before that, by the Corps of Engineers.

<sup>23</sup> The US Army did not have an exact equivalent of the Navy’s “United States Ship” (USS) for commissioned vessels or “United States Naval Ship” (USNS) for Navy-owned, non-commissioned auxiliaries “in service”. The Army also did not have an equivalent of the Navy’s “in commission” distinction from ships “in service”. The term “United States Army Transport” (USAT) was applied (or sometimes not) to the large troop and cargo vessels owned by the Army and it was never applied to other vessels. The mine planters were “US Army MP”

Dedicated mine planters were custom-built for the US Army from 1904. They had wide decks to hold the assembled mines, and the necessary booms and davits for loading the assembled mines from the wharf and planting the mines out in the channel.<sup>24</sup> Such vessels had to be fairly large, despite being purely for coastal use, as they had to be able to carry several mines, plus the equipment (booms etc) to deploy or recover them. There would also be a need for other, smaller vessels also used, to lay cables, for example.<sup>25</sup>



*Examples of a yawl and DB Boat<sup>26</sup>*

A mine flotilla used to sow the minefield would consist of a mine planter, a distribution box boat (or “DB boat”, also known as a “L-boat” after the numerical designation on the side of the boat)<sup>27</sup>, and two to four yawls (a type of small boat).<sup>28</sup>

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abbreviated USAMP before the name. Most Army vessels, as with smaller non-commissioned Navy yard and utility craft, had no prefix at all: <https://ianewatts.org/u-s-army-harbor-boat-service-watercraft-designations/>

<sup>24</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

<sup>25</sup> <https://xbradtc2.com/tag/coastal-artillery/>

<sup>26</sup> <http://www.maquetland.com/article-phototheque/14543-mines-warfare-mine-sous-marine-m3-buoyant-mine-fort-miles>

<sup>27</sup> These were smaller boats that held the distribution box for each group of mines while it was being attached to the cables as the mines were being planted. The DB boat had a large boom to hoist an assembled distribution box over the bow and lower it into the water.

<sup>28</sup> Mine yawls were typical small craft which were used to ferry ropes, cables, etc., from the mine planter to the DB boat or shore as needed.

<https://cdsg.org/coast-artillery-submarine-mine-defenses/>



*Mines ready on the deck of a planter<sup>29</sup>*

While, before World War I, the US Army possessed a fleet of mine planters and other vessels to support its large number of coast defence commands, and for use at the various harbour defences in the Continental US and three overseas Departments (including the Canal Zone), in 1917, it was found that the number of mine planters was inadequate to meet needs. As a result, the Army placed orders for at least 24 new vessels (eight “primary” and 16 “junior” planters<sup>30</sup>) during the war. However, these were completed too late for use in the war and, in the early 1920s, five of the eight new primary planters were transferred to the US Coast Guard or to the US Lighthouse Service. The remaining three, along with the six older mine planters, formed the backbone of the Army’s mine planting service in the interwar period. It would be vessels of this vintage that would be responsible for sowing the minefields in the Canal Zone.<sup>31</sup>

From 1924, a change in regulations allowed for use of the vessels for other duties when not needed for work with mines or artillery. Apparently, the reality was that they were seldom

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<sup>29</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

<sup>30</sup> Aka “pup” planters.

<sup>31</sup> While new planter vessels were ordered in 1940 and constructed in 1942-43, with the reduction of static harbour defences later in the war, many of these were transferred to the US Navy.

used for mine and artillery work, and then only when the Harbor Defence Command did not have some other work for them.<sup>32</sup>

By 1929, crews were said to comprise of a commissioned officer, five warrant officers and 21-24 enlisted men – a complement considered to be too small at the time.<sup>33</sup>

Pre-war, six vessels were located at various commands in the Continental US, with two of the primary planters assigned to the Philippines and another to the Panama Canal

Department.<sup>34 35</sup>



*Mine planter at a dock, ready to load mines and associated equipment<sup>36</sup>*

A series of new mine planters ordered in 1940 were 188 feet (57.3 metres) in length, with a beam of 37 feet (11.3 metres), 12½ feet (3.8 metres) draft and displaced 1,320 tons (1,197

tonnes). They had a wartime crew of two officers, six warrant officers, and 41 men.<sup>37</sup>

However, many of these vessels would end up in use with the US Navy, with the Navy being given responsibility for all mining operations.

The Coast Artillery Corps was disestablished in 1950, and some of the mine planter vessels had been transferred to the US Navy and designated Auxiliary Minelayers (designated ACM, later MMA), the Navy having taken on the mining role from the Army. The Army Mine Planter Service was officially disestablished in 1954.

<sup>32</sup> [https://www.researchgate.net/publication/301565111\\_The\\_US\\_Army\\_Mine\\_Planter\\_Service\\_1901\\_1929](https://www.researchgate.net/publication/301565111_The_US_Army_Mine_Planter_Service_1901_1929)

<sup>33</sup> Ibid.

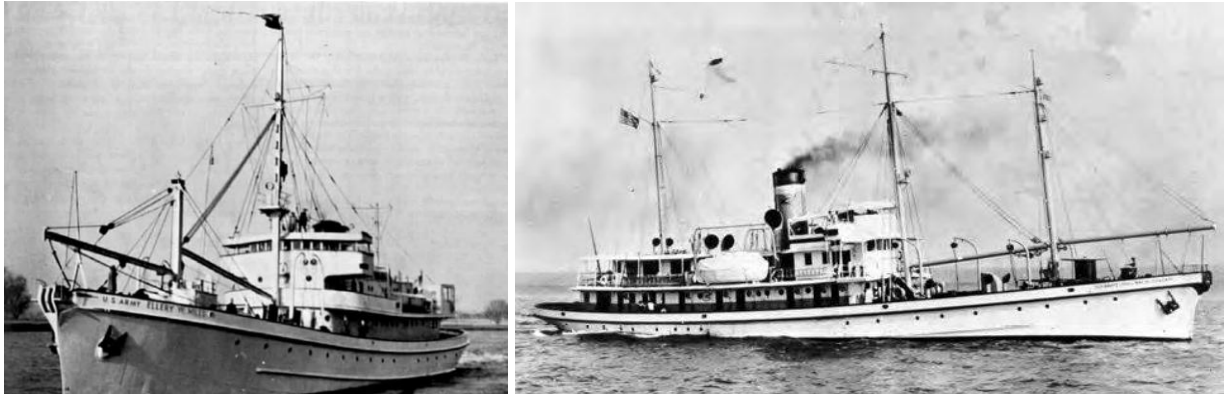
<sup>34</sup> Hawaii had no primary planter, but did have two (later three), Harbor Boat Service vessels that were used to support the training of coastal artillery batteries and planting sections from time to time (and, occasionally, the primary planters from San Francisco or Puget Sound would travel to Hawaii to also support those activities).

<sup>35</sup> <https://apps.dtic.mil/sti/pdfs/ADA562276.pdf>

<sup>36</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

<sup>37</sup> <https://cdsg.org/coast-artillery-submarine-mine-defenses/>

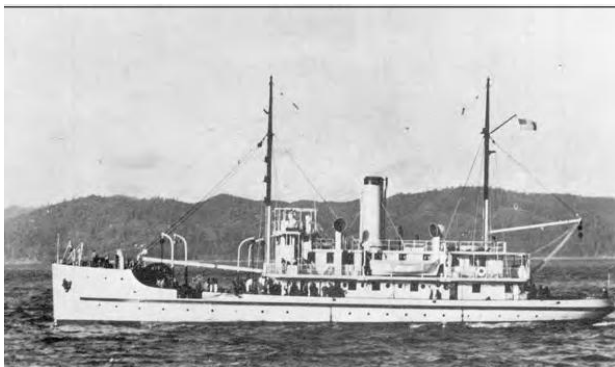
## THE MINE PLANTERS OF THE CANAL ZONE IN WORLD WAR 2



US Army Mine Planter *Lt Col Ellery W Niles* (left)– in June 1940 she was despatched to Fort Amador and in June-August 1940, with the *Gen William M Graham* (right), installed the wartime minefields protecting the Canal Zone.

The *Lt Col Ellery W Niles* was launched in 1937 and arrived in 1940 from California. It was sold after World War 2; renamed as the civilian *F V Hunt* and served as an acoustical research ship under contract to the US Navy in the Bahamas into the 1960s; operating as the Cayman Salvage Master in the Cayman Islands as of the mid-1980s. She ended up forming part of a man-made reef in the Florida Keys.

The *Gen William M Graham*, launched in 1917, was decommissioned and sold in Panama in 1945 and renamed *SS Panama City*, eventually being scrapped in 1948 and deleted from the list of US Merchant Vessels after 1949.<sup>38</sup>



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<sup>38</sup> <http://www.navsource.org/archives/30/11/1102.htm>

The *General J Franklin Bell* was launched in 1920 and arrived at Fort Randolph in June 1940. She was renamed as the *Brigadier General John J Hayden* in 1941, and sold after the war.



The *Major General Clarence M Condon* was launched in 1919 and, until 1941, she served in the Harbor Boat Service as a freight and passenger craft at Pensacola Harbor. She was then reconditioned as a junior mine planter in 1941, and transferred to the Panama Canal Department.<sup>39</sup>



Not a mine planter, but an example of a DB Boat (see above for an explanation of the term), the photo is said to show the L36 in Panama, probably in 1917.

### THE MINE GROUP

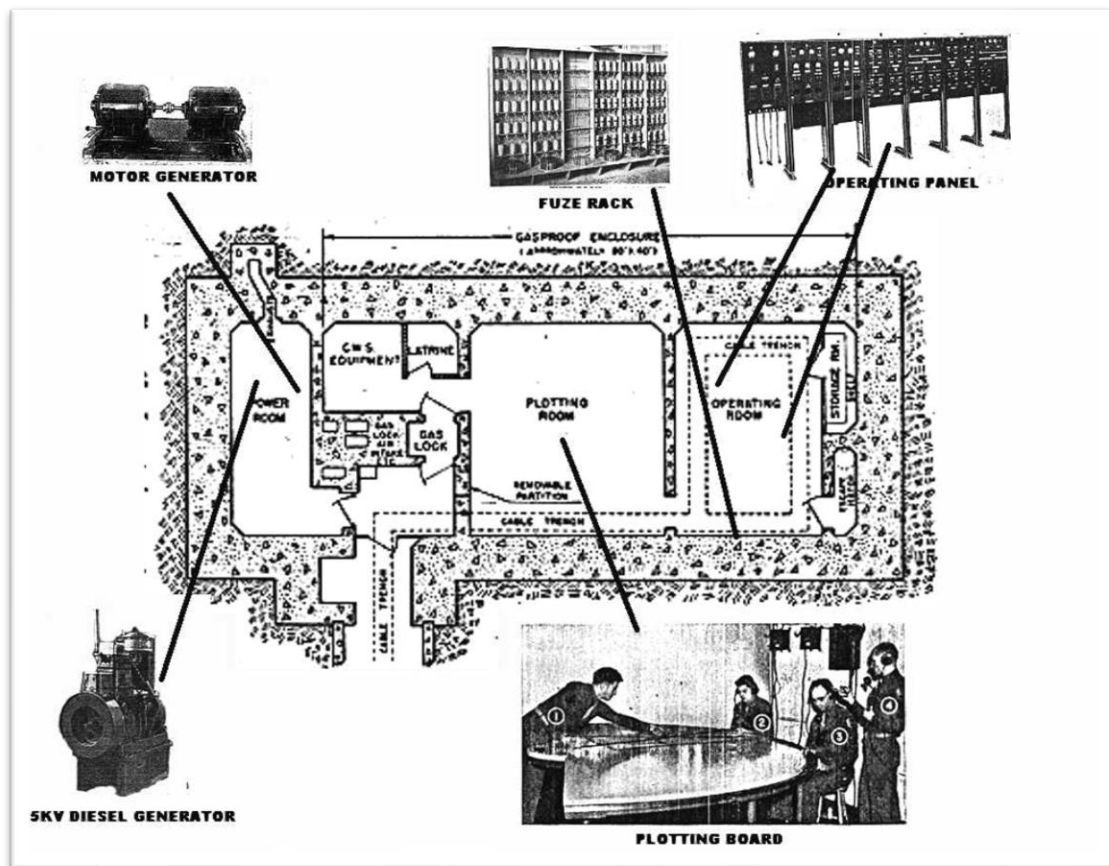
A mine group was the tactical and technical unit for the employment of controlled submarine mines provided for the defence of a given water area, such as a harbour and its immediate approaches. It included the, structures, personnel, equipment, and vessels necessary for the planting, operation, and protection of the mine field.

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<sup>39</sup> <https://apps.dtic.mil/sti/pdfs/ADA562276.pdf>

The mine group consisted of a headquarters, a mine group detachment, two or more batteries, and one or more mine planters. The group headquarters included the group commander and a staff consisting of a plans and training and intelligence officer, a communication and searchlight officer, and a mine property officer.<sup>40</sup>

Such a mine group detachment was a subdivision of the Harbour Defense Command for the harbour involved and, with the addition of a mine property detail, is similar in organisation and duties to a gun group detachment.



### THE HARBOR DEFENSE COMMAND

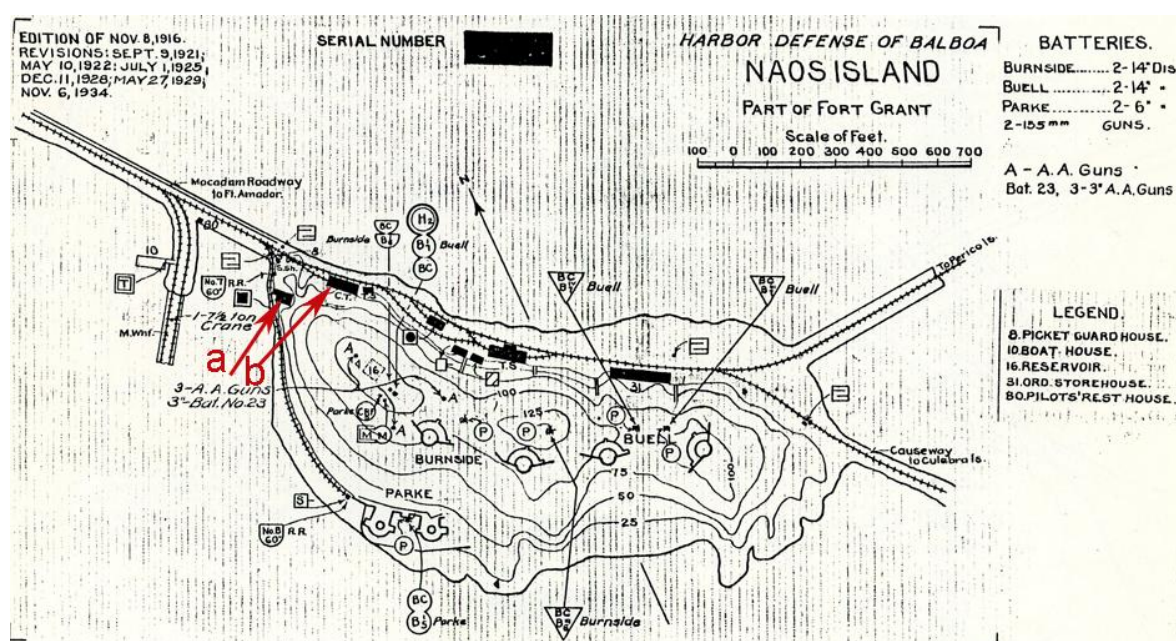
These were established in 1925, in succession to Coast Defense Commands dating back from just before World War 1<sup>41</sup>. It controlled the forts, minefields and other coastal defences of

<sup>40</sup> The mine property officer is responsible for the serviceability of all mine storerooms, cable tanks, wharves, boat houses, and mine boats other than mine planter ships.

<sup>41</sup> Predecessor organisations went back to 1895.

US harbours and rivers.<sup>42</sup> Like the Coast Artillery Corps itself, they were disestablished in 1950.

Several of the Commands were disarmed and disestablished between World War 1 and World War 2, although minefield defences may have been retained. However, those in the Canal Zone were retained, though somewhat downgraded. The two in the Canal Zone controlled the defences of Balboa at the Pacific end of the Canal, and Cristobal at the Caribbean end. By the time the US entered World War 2, the Coast Artillery Corps had 25 Harbor Defence Commands with minefields.<sup>43</sup>



*Map of defences of Naos Island, with the mine casemate ("a"), where the explosives were stored, and mine preparation and control headquarters on the rail link ("b") indicated. The latter building is shown in the photograph below<sup>44</sup>*

<sup>42</sup> In addition to the Continental US, there were Commands in Hawaii, Puerto Rico and the Philippines. After the 1940 Destroyers for Bases Agreement with the UK, further overseas Commands were established in Newfoundland, Bermuda and Trinidad, these continuing until 1946.

<sup>43</sup> <https://laststandonzombieisland.com/2024/01/22/those-wacky-army-sea-mines/>

<sup>44</sup> <https://www.czimages.com/CZMemories/Photos/photoof1306.htm>

## THE EVOLUTION OF US COASTAL DEFENCE FROM 1886<sup>45</sup>

In 1886, the report of the Endicott Board<sup>46</sup> brought about a new era of coastal defences in the US and, later, the Canal Zone, with details of recommended strategy and weaponry. After two years, in 1888, Congress began appropriating funds for the programmes the Report had outlined, although it never fully funded all the recommendations. The production of the necessary large-calibre guns and rifled mortars followed, together with the installation of submarine sea mines.<sup>47</sup>

The objectives were to protect commercially important coastal cities from bombardment, to provide a haven for the US merchant fleet and to protect merchant shipping. This was felt necessary as numerous countries at the time had, or were building, navies of respectable size that could threaten the Continental US.

The principal behind the defence system was to protect the guarded area from invasion and capture, and protect it from bombardment and submarine or surface torpedo attack. The approaches to ports and anchorages would be protected to allow the US Navy to emerge and counter enemy warships.<sup>48</sup> The later addition of Army patrol and bomber aircraft in the 1920s and 1930s was an obvious extension of this concept.

In 1894, the War Department established the Board of Regulation of Seacoast Artillery Fire, as efforts were made to improve the accuracy, and accurate range, of batteries. Tests later demonstrated that even mortars could be used effectively against moving vessels (using the prediction-finding system outlined above).

In 1901, the Coast Artillery Corps was established. The first Chief of Artillery was Brigadier General Wallace Randolph, after whom Camp Randolph in the Canal Zone would later be named.<sup>49</sup>

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<sup>45</sup> *Evolution of Major-Caliber U.S. Coastal Defense Guns, 1888-1945* by William H Dorrance (Army History No. 37, Spring 1996), US Army Center of Military History: <https://www.jstor.org/stable/26304359?seq=1>

<sup>46</sup> Named after the then-Secretary of War, William C Endicott

<sup>47</sup> By the time of the Spanish-American War in 1898 at least 28 important harbours and chokepoints were being defended by Army controlled minefields

<sup>48</sup> <https://www.globalsecurity.org/military/facility/coastal-forts-ww2.htm>

<sup>49</sup> <https://cdsg.org/coast-artillery-corps/>

In 1905, President Theodore Roosevelt directed the establishment of what became the National Defense Board (aka the Taft Board) to review and revise the Endicott Report and incorporate developments since its publication. The resulting 1906 report included a recommendation that the Canal Zone be added to the list of locations protected (bearing in mind that the Canal was then still under construction, and would not open until 1914).

In 1907, the US Army artillery was split into two elements - a field artillery, with a regimental organisation, and the Coast Artillery Corps, with additional coast artillery companies.<sup>50</sup>

A further review report in 1915 from the Scott Board<sup>51</sup> (The Report of the Board of review on the Coast Defenses of the United States, the Panama Canal and Insular Possessions) made recommendations, including the need for more powerful 16-inch guns and mortars. However, the war was long over when the first 16-inch guns recommended by the Scott Board report were emplaced in 1923 (as part of the defences of Long Island, New York). Even the first of the recommended new 12-inch gun barbettes was not in place until 1921.

By the time the US entered World War 1 in 1917, the German High Seas Fleet, the main danger, had been bottled up in port by the Royal Navy. In addition, the need for mobile artillery saw many guns – large and smaller calibres – and many 12-inch mortars removed from coastal forts. Few were to be returned after use in France (although, in fact, few of the guns reached France before the Armistice).

In August 1921, the War Department ruled that the Coast Artillery Corps would furnish all artillery necessary for land and coast fortifications, and all anti-aircraft, railway, and trench mortar artillery for use either with fortifications or with the armies in the field.<sup>52</sup>

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<sup>50</sup> <https://cdsg.org/coast-artillery-corps/>

<sup>51</sup> Named for its chairman, the Chief of Staff, Major general Hugh L Scott

<sup>52</sup> However, the General Order went on to say that nothing would prohibit “*the organization within the coast artillery of such mobile units as may be needed in land or coast fortifications or the employment of such units with field armies whenever or wherever conditions of combat indicate the desirability of such employment.*” Thus, the door was clearly left open for the CAC [Coast Artillery Corps] to again supply heavy field artillery for use in the field.

After the Washington Naval Conference 1921-22, and the cancellation and scrapping of some capital ships, surplus 16-inch guns became available for use in coastal defence – although budgetary constraints hampered their installation.

The size of the Coast Artillery Corps was reduced substantially in the postwar cutbacks. However, as the overseas and insular possessions required garrisons strong enough to withstand attack until relief could arrive, the Canal Zone, having among the largest coast artillery garrisons, became one of the principal training locations for all the Corp's assigned missions: seacoast artillery, anti-aircraft artillery, and mobile railway and tractor-drawn artillery.<sup>53</sup>

As early as 1923, the War Department had recognised the need to improve coastal defences, and that a larger fleet or a large number of aircraft could provide better protection for harbours than the existing defences. However, the cost was considered uneconomical, with the cheapest option being seen to rely on guns and mines.<sup>54</sup>

In 1924, a regimental organisation of the Coast Artillery was instituted<sup>55</sup> and, during the 1920s, the US Army recognised the need for defence of the coastline away from the harbours, with tractor-drawn 155 mm guns being available. Once more, budgetary constraints prevented wholesale development of ideal defences, and during the 1920s and 1930s it was said that the US allowed its coastal defences to decay. One of the few notable important improvements made during the 1920s and 1930s was the despatch of two 14-inch railway guns to bolster the defences of the Canal Zone.

On 9 June 1925, Coast Defense Commands were renamed Harbor Defense Commands, to describe their role more accurately, and to emphasise that the coast artillery was to defend key locations, rather than the entire coastline. As we have seen, there would be two such Commands in the Canal Zone.<sup>56</sup>

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<sup>53</sup> By June 1924, only 144 of the Corps' coastal artillery companies were active.

<sup>54</sup> <https://www.globalsecurity.org/military/facility/coastal-forts-ww2.htm>

<sup>55</sup> <https://cdsg.org/coast-artillery-corps/>

<sup>56</sup> <https://cdsg.org/wp-content/uploads/pdfs/FORTS/CACunits/CACorg2011.pdf>

In 1927, all divisional, corps, and general headquarters artillery (except for railway and anti-aircraft artillery) were assigned to the field artillery. However, the 155mm tractor-drawn coast artillery units were dedicated to seacoast defence, and no longer charged with supporting the field armies as they had in World War 1. The Corps was also relieved of the need to train on and maintain the larger howitzers of the siege artillery, and shortly thereafter, all trench mortar units were transferred to the field artillery. The changes simplified training, allowing the Corps to focus its meagre resources on seacoast and anti-aircraft defence.

By 1930, most regular harbour defence units in the Continental US had been reduced to skeleton level and nearly all the harbour defences in the US were in caretaker status. As mentioned, those in the Canal Zone were less affected by these cutbacks.

In 1931, the Harbour Defense Board was constituted by the Army to supervise defence projects in various harbour areas, though funds remained meagre.<sup>57</sup>

In 1935, Congress authorised an increase of almost 50% in the Corps establishment, but since these increases were all in the grade of private, with no increases in officers, there were no new units.<sup>58</sup> The 1940 Selective Service Act was to result in the first peacetime draft, and a rapid build-up of all Regular Army coast artillery regiments; and existing National Guard coast artillery regiments were called into federal service, originally for a year's training.

As a result of the previous neglect, in 1940, the Chief of Coast Artillery said that *"With a few exceptions our seacoast batteries are outmoded and today are woefully inadequate"*, noting that most had no overhead cover to protect against air attack. In the case of the batteries in the Canal Zone, for example, the vulnerability to air attack would become a concern, particularly after the Pearl Harbor attack.

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<sup>57</sup> <https://www.globalsecurity.org/military/facility/coastal-forts-ww2.htm>

<sup>58</sup> The National Guard units were also expanded.

The collapse of the international naval limitation agreements in the 1930s, meaning that potential adversaries could construct more, larger, and heavier armed warships, is said to have emphasised the need for better long-range guns, adding another concern to the worry of the threat of air attack.

The growing tension with Japan saw most of the limited funds available for harbour protection between 1933 and 1938 being spent on improvements on the Pacific coast of the Continental US. It would take the threat of war in Europe to prompt greater appropriations and improvements on the Atlantic coast as well.<sup>59</sup>

In July 1940, responding to the criticisms expressed by the Chief of Coast Artillery, the Harbor Defense Board recommended adoption of the 16-inch gun as the standard seacoast gun<sup>60</sup>, alongside other improvements (including the 6-inch gun as the secondary weapon), and this plan was approved by the General Staff in September 1940 and funding made available.<sup>61</sup> Of course, the US entered the war before most of the construction plans could be completed. In fact, only 15 of the planned 39 16-inch gun batteries were completed before the Coast Artillery was disbanded in 1950.

Despite the Chief of Coast Artillery having warned of the lack of adequate protection from aerial attack, in 1940, the War Department's view was that the shortage of anti-aircraft guns was so severe that no mobile, and no more fixed, weapons could be spared for harbour defences.

A modernisation plan was approved in September 1940, over objections of the Chief of the Air Corps who argued that land-based bombers would provide a better option than additional coastal artillery guns. \$62 million was authorised, with a completion target of the end of June 1942. However, the project had to compete with the general expansion of the Army and Navy and, by mid-1941, the plans were far behind schedule and growing air and sea power assets would seem likely to make them unnecessary. The emphasis on improving oversea bases

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<sup>59</sup> <https://www.globalsecurity.org/military/facility/coastal-forts-ww2.htm>

<sup>60</sup> The Army had opted for the 16-inch gun mounted in a protective barbette as the standard harbour defence weapon against capital ships, but few had been installed by the outbreak of World War 2.

<sup>61</sup> In February 1940, it was estimated that to complete all planned projects would cost \$60 million. The July 1940 report gave an estimate of \$82 million for all projects, taking three years to complete them.

defences, such as in the Canal Zone, also affected improvements in the US. It was therefore decided to limit activity to just those projects which could be completed by the end of June 1944. However, many of the defensive guns in the Canal Zone would have been mothballed (or even disposed of) by mid-1944.

By early 1944, another reorganisation saw harbour defence regiments broken up into battalions in 1943–44, in line with an Army-wide policy for all units except infantry, and some former Coast Artillery units were converted into heavy field artillery units. New battalions were generally created as anti-aircraft artillery units.<sup>62</sup>

During the war, harbour defence battalions were generally stationed in fixed continental defences, such as in the Canal Zone. Anti-aircraft groups and separate battalions were initially assigned to the Continental US and to Panama and Hawaii, but anti-aircraft units would later generally be assigned to mobile armies in combat theatres.

In 1946, with the demobilisation of the Army well underway, the skeleton seacoast artillery units were again relegated to caretaker status once more – although those in the Canal Zone had already been run down, or even discontinued.

Experience during World War 2 had demonstrated the folly of relying upon fixed coastal defences, especially if tied to particular harbours. It was not surprising that the postwar Simpson Board (the Board of Officers on the Organization of the War Department) recommended that the Coast Artillery be disbanded (this requiring an Act of Congress, as one had been used had created the offices of Chief of Field Artillery and Chief of Coast Artillery).

The Corps was disestablished in 1950.

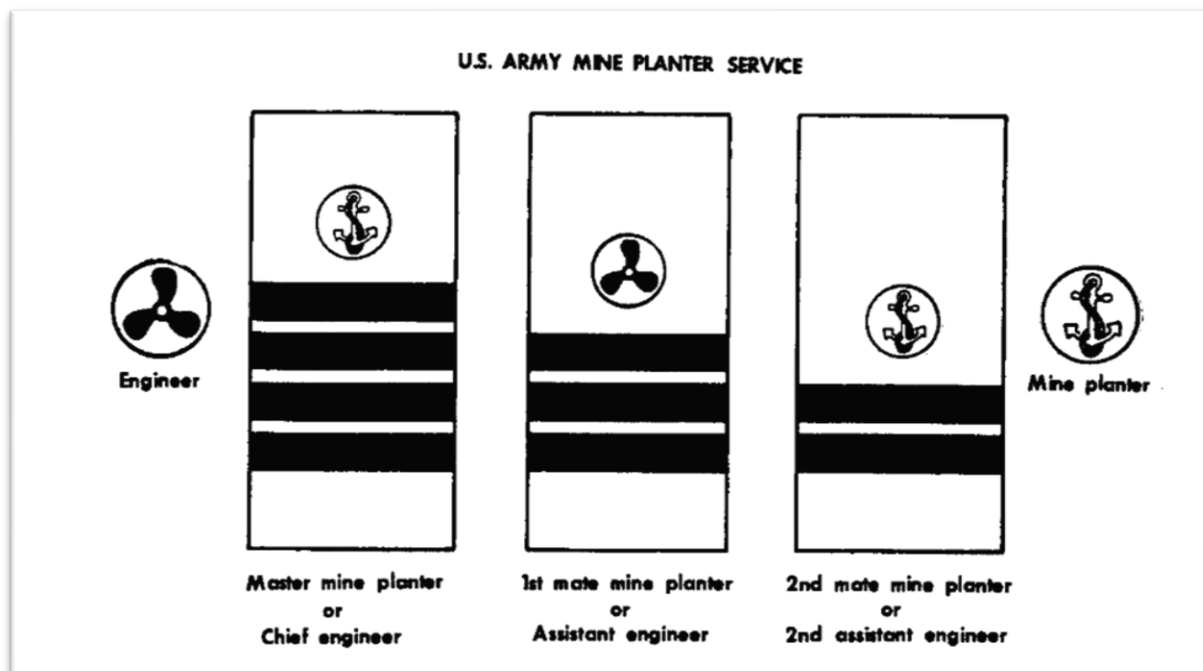
### **THE WARRANT OFFICER**

While the term “Warrant Officer” has a much longer history, in the US Army the Army Warrant Officer Corps owes its existence to the US Army Mine Planter Service, and was

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<sup>62</sup> <https://cdsg.org/coast-artillery-corps/>

created in 1918 by the Act of Congress that also established the Army Mine Planter Service as part of the Coast Artillery Corps.<sup>63</sup>



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<sup>63</sup> <https://warrantofficerhistory.org/PDF/Casemate+WO+article+-7-25-08.pdf>  
[https://warrantofficerhistory.org/Hist\\_of\\_Army\\_WO.htm](https://warrantofficerhistory.org/Hist_of_Army_WO.htm)