Razzle Dazzle Camouflage – Was it Effective?

By Geoff Walker



Unknown photographer

The British have always been very innovative in conducting warfare, especially when it involved "Camouflage" both ashore and afloat. **"Dazzle Camouflage"** was just one of those many innovations. It consisted of complex patterns and geometric shapes in contrasting colors, interrupting, and intersecting, each other. It was not limited to just "Black and White", but often multiple colors were introduced into the patterns.

"HMS Belfast" at her London moorings

British Artist and naval officer, Norman Wilkinson had this very insight and is accredited with pioneering the **Dazzle Camouflage** system - known as **Razzle Dazzle** in the United States. Wilkinson used bright, loud colors and contrasting diagonal stripes to make it incredibly difficult to gauge a ship's size and direction.

How to camouflage ships at sea was one of the big questions of World War I. From the early stages of the war, artists, naturalists, and inventors showered the offices of the British Royal Navy with largely impractical suggestions on making ships less visible, or difficult to define.

Wilkinson's innovation, what would be called **"Dazzle"**, was rather than using camouflage to hide the vessel, he used it to hide the vessel's intention. Later he'd say that he'd realized, "Since it was impossible to paint a ship so that she could not be seen by a submarine, the extreme opposite was the answer – in other words, to paint her, not for low visibility, but in such a way as to break up her form and thus confuse a submarine officer as the course on which she was heading."

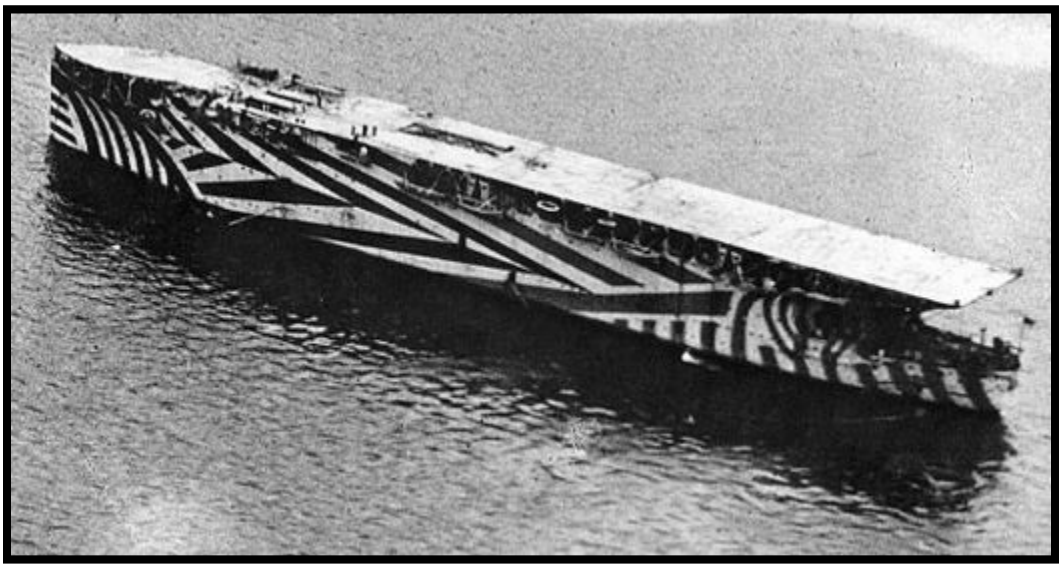
Wilkinson used broad stripes and polygons of contrasting colors—black and white, green, and mauve, orange, and blue—in geometric shapes and curves to make it difficult to determine the ship's actual shape, size, and direction. Curves painted across the side of the ship could create a false bow wave, for example, making the ship seem smaller or imply that it was heading in a different direction: Patterns disrupting the line of the bow or stern made it hard to tell which was the bow or stern, where the ship actually ended, or even whether it was one vessel or two; and angled stripes on the funnels could make the ship seem as if it was facing in the opposite direction.

It was cheap, quick to apply and was claimed to be highly effective, and widely adopted during the First World War and to a lesser extent during the Second World War. Above left, is a depiction of HMS Belfast in a later version of camouflage. Camouflage is usually about blending into a background setting, making an object harder to detect, but some of the most unusual camouflage used on ships during the World Wars, wasn't designed to do that.

With the introduction of “Submarine Warfare” in the First World War the Allies devised a method of deceiving enemy U-Boats. Dazzle camouflage was a widely used camouflage method, instead of attempting to hide a ship, the goal was to conceal the ship’s course through flashy misdirection. These colorful ships had artistically adventurous patterns that, due to the limitations of U-boat periscopes and torpedoes at that time, were surprisingly effective at keeping ships safe. Submarines and torpedoes, were hitherto a little regarded threat, but during WW1 they were to develop into the most dangerous of all maritime menaces.

Despite this, the U-boat had limitations; to be effective torpedoes required calculation of the target’s trajectory. Factors such as the angle a ship was traveling, its speed, and its distance from the U-boat itself, all came into the equation. These elements were usually determined by eye, through the periscope, or using a rangefinder. The introduction of Dazzle patterns made it a lot harder for a submarine commander to determine a ship’s trajectory, because it helped hide key points of reference for torpedoes, like the ship’s overall orientation. Unlike other forms of earlier camouflage, the intention of “Dazzle” was not to conceal, but rather to make it difficult to estimate a target's range, speed, and heading. Hence, the Dazzle scheme was adopted by the British Admiralty, and then later by the United States Navy, with each ship's dazzle pattern being unique, to avoid making classes of ships instantly recognizable to the enemy.

In 1914, the then First Lord of the Admiralty, Winston Churchill, was convinced to trial the new scheme on Royal Navy ships. Over 4000 British merchant ships and some 400 naval vessels were painted in Dazzle Camouflage during 1917–1918. However, following Churchill's departure from the Admiralty, the Royal Navy reverted to its traditional plain grey paint schemes.



Unknown photographer

A striking image of an early Aircraft Carrier, HMS. Argus; depicted with Dazzle Camouflage in 1917.

However effective “Dazzle Camouflage” may have been in World War I, it became less useful as rangefinders and especially aircraft became more advanced, and, by the time it was again utilized in World War II, Radar further reduced its effectiveness. However, it may still have played a part in

confounding enemy submarines. In the Royal Navy, Dazzle paint schemes reappeared in January 1940 on both warships and merchantmen. There was a variety of measures introduced on ships to foil the enemy. One of many was the false bow wave, intended to confuse ship's speed.



Unknown photographer

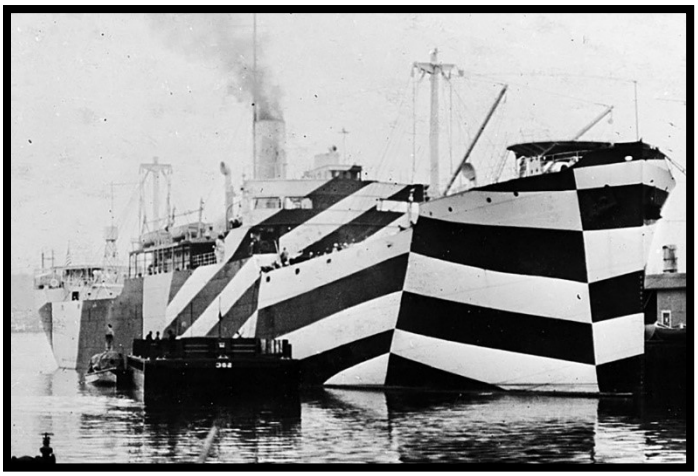
Aircraft Carrier HMS Furious photographed in 1918

During the inter-war years, Royal Navy ships were painted dark gray in the Home Fleet, light gray in the Mediterranean and Caribbean Seas, and white in the Indian Ocean and western Pacific. Many Home Fleet ships were painted medium gray during 1939 and 1940 to decrease visibility, from the peacetime dark gray.

During the initial years of WW2, British Captains largely painted their ships as they saw fit. **HMS Grenville** is believed to have been the first ship to adopt a disruptive camouflage paint scheme in December 1939, and several G-class destroyers of her flotilla used a similar scheme of contrasting stone-colored polygons and when concern arose within the Admiralty about German aerial reconnaissance of Scapa Flow, some Home Fleet ships were painted with disruptive Flotta schemes of dark brown, light gray, and light green polygons. Primarily between April to August 1940, for concealment and identity confusion in port. Most Home Fleet ships had been repainted medium gray by December 1940.

As far as submarines were concerned, Royal Navy submarines serving in the Mediterranean were painted dark blue, to reduce submerged visibility to aircraft, as well as breaking of their silhouette during surface action at night.

An experimental coating able to change color was tested on Royal Navy submarines. Lead oxide was applied to the hull, enabling it to become black on application of a solution of sulphate, and sea water, for night operation. For daylight operations, a solution of hydrogen peroxide and sea water, would be applied, producing sulphate, and returning the hull to a whiteish color, desirable for daytime conditions. How successful this may have been is a matter of conjecture. At one stage it was suggested that submarines be camouflaged in a striped Mackerel color scheme, but this was rejected by the Admiralty.



A stunning image of a merchant ship **SS West Mahomet** in “Dazzle Camouflage” during the First World War. Clearly showing how the true profile and aspect of the vessel has become an “optical illusion” due to its paint scheme, thus posing a much more difficult target for any Axis U-Boat commander.

Unknown photographer

In the Mediterranean Sea during WW2, Captain, Lord Louis Mountbatten's 5th Flotilla of K class destroyers, were painted in a shade of pink in 1940. Mountbatten had earlier observed a Union-Castle Liner disappear from convoy during an autumn sunset because of the company's unusual lavender-mauve-gray hull color. Mountbatten reasoned the color would be effective camouflage during dawn and dusk periods and devised a similar shade. Its effectiveness was much disputed; but it was applied to other destroyers, a few cruisers, and numerous small warships which maintained the scheme through 1944 for use in coastal waters.

It was not until October 1940 that the Admiralty introduced a camouflage section. Admiralty camouflage schemes disseminated in 1941 were not universally adopted because of difficulties with operating schedules and shortages of some paint pigments. Nearly all destroyers and larger ships wore an Admiralty disruptive camouflage scheme by late 1942; but Commonwealth Captains executed official camouflage schemes with greater variation than was normally customary at the time.

Initial Admiralty disruptive camouflage schemes employed polygons of varying shades of gray, blue and green so at least two of the colors would blend with background sea or sky under different light conditions. Schemes devised for capital ships emphasized identity confusion rather than concealment. **HMS Queen Elizabeth** became the first ship to receive an official camouflage scheme in January 1941. As more ships received similar schemes through 1941 it became evident the polygons were too small to be differentiated at effective camouflage ranges. So, simplified Admiralty light and dark disruptive schemes were widely used by 1942 to use larger and simpler polygons with no more than four colors. Light disruptive schemes were intended for use in the higher latitudes where skies were often overcast. Dark disruptive schemes used darker colors providing more effective disruption in latitudes where bright sunlight could be reasonably expected.

The Admiralty Western Approaches scheme evolved from a camouflage scheme applied to **HMS Broke** in June 1940 at the suggestion of the naturalist **Peter Scott**, who was serving aboard that ship. **HMS Broke** was painted white with large polygonal patches of light gray, light sea blue and light sea green. **HMS Broke** achieved some notoriety in a collision, where the Captain of the other ship claimed to have had much difficulty seeing **HMS Broke**.

Escort Captains, hearing of the **HMS Broke** incident began to experiment with similar schemes including polygons of dark gray or dark blue for increased disruptive contrast, while others tried painting their ships entirely white to emphasize concealment. The Admiralty omitted light gray from Peter Scott's scheme. White with large polygonal patches of light sea blue and light sea green was adopted in mid-1941 for use exclusively on destroyers and smaller ships engaged in anti-submarine operations. This was an effective scheme under normal North Atlantic weather conditions, where fog and heavy overcast conditions could be expected.

The Admiralty's informal approach to sea camouflage eventually changed, when a branch of the Naval Research Laboratory was established under Commander James Yunge-Bateman, to experiment with various kinds of ship camouflage schemes and designs. Painted models were floated in a large tank and examined against different backgrounds, using theater lamps to simulate varying lighting conditions. Substantial advances in camouflage schemes were made by this establishment, using this method.

After the Second World War, the universal adoption of radar made traditional camouflage generally less effective, and led to development of more stealthy ships, a newer form of radar camouflage and deception. However, camouflage may have helped United States warships avoid hits from Vietnamese shore batteries which used optical rangefinders. Some U.S. Navy PTF boats were camouflaged experimentally in 1975 with green overall, broken up by patterns of gray and black. In more recent times, **USS Freedom**, a littoral combat ship, is however said to be the first U.S. Navy ship to have camouflage reminiscent of that used in the World wars.



Left, the American Littoral Combat Ship **USS Freedom** seen in a modern form of Dazzle Camouflage.

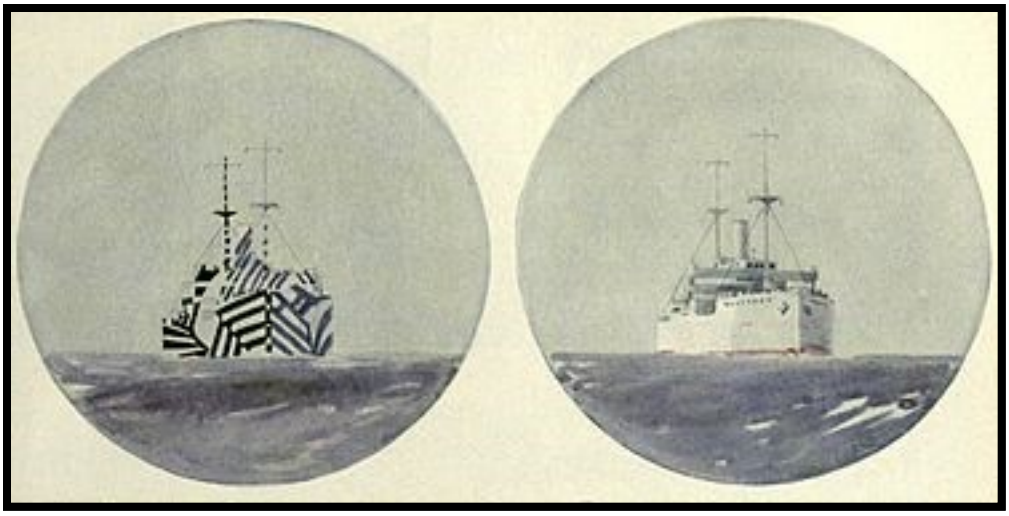
Unknown USN photographer

Today, despite all the advances in Electronic Warfare, Dazzle patterns are still used, so they must have been at least partially successful in bygone years. However, experiments were carried out on aircraft in both World Wars but with little success. With the gift of hindsight, too many factors had been varied for it to be possible to determine which aspects of “Dazzle” were significant, or which schemes worked best. Several experiments on Dazzle Camouflage were conducted, but they failed to show any reliable and definitive advantage over plain paintwork.



Unknown contributor

An image clearly showing how a vessel’s profile can be “broken up” by the use of “Dazzle Camouflage”, causing identification of the ship or its class, far more difficult to ascertain and recognize.

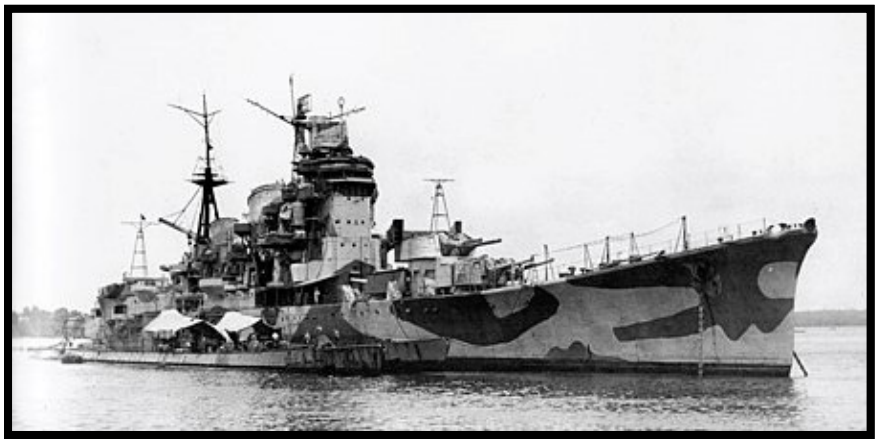


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Although the Jury is still out in making a final decision as to how useful “Dazzle” may have been. In my opinion, readers are the best judge of the effectiveness of “Dazzle”. Above is a view through a submarine’s periscope; on the left a vessel in “Dazzle Camouflage”, with the same vessel seen with normal paintwork on the right. There is no doubt in my mind that the ship in “Dazzle” is a much more difficult target to judge, compared to the other vessel, and would have posed a much more challenging target for any hostile U-Boat commander, to make a hit.

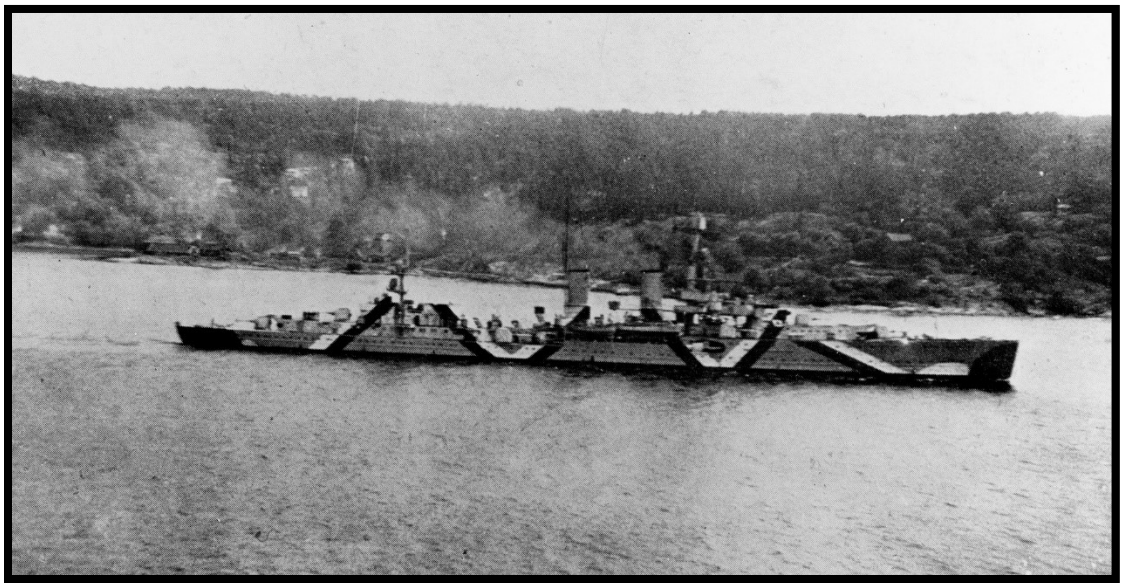
Germany did also use disruptive camouflage on their capital ships, during the wars, under certain circumstances, but mainly retained their overall dark grey color scheme. Besides, the majority of Germany’s war effort at sea in WW2, was focused on submarine warfare.

Italy, and Japan also used disruptive camouflage on their larger warships during WW2, but not to the same extent as the Allies.



The Imperial Japanese Navy Cruiser **Myoko** in disruptive camouflage. Photographed at Singapore in 1945 after surrender. Note the two submarines tied up alongside.

Unknown photographer



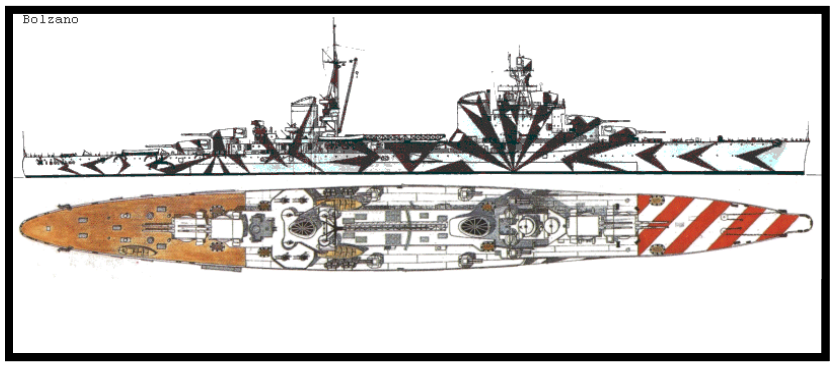
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The German Cruiser **"Emden"**, seen in Dazzle Camouflage, photographed in Norway's Oslofjord, ca 1941.



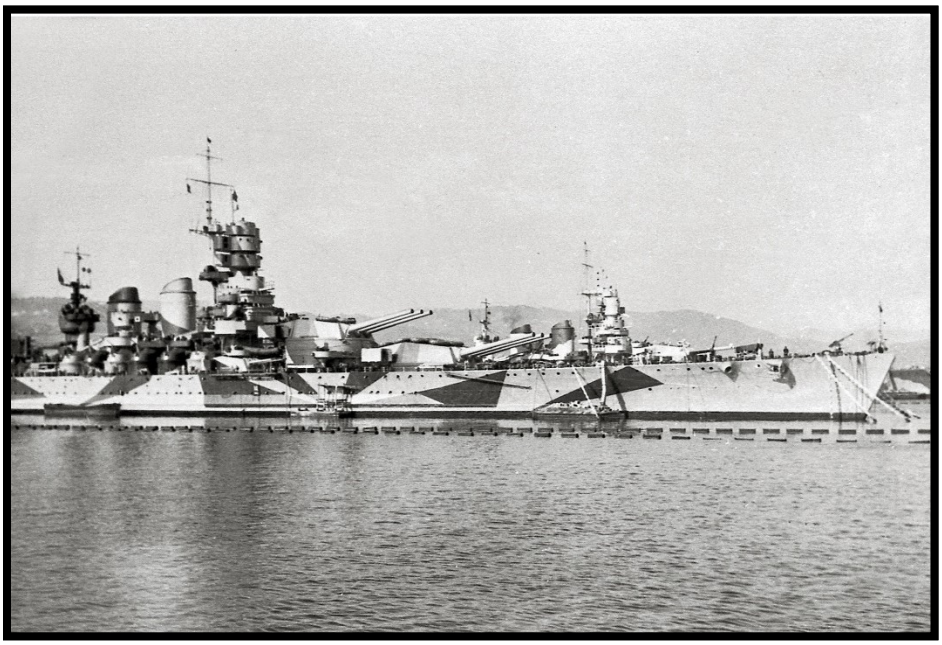
The WW2 Italian Navy Battleship **"Roma"** underway at speed, clearly exhibiting her disruptive camouflage paint scheme.

Unknown photographer



The Italian Navy Heavy Cruiser **"Bolzano".** The drawing shows the "Dazzle Camouflage" scheme used on her during WW2.

Even if not the most effectively used battleships during WW2, they definitely were among the most colorful. Italian capital ships **“Vittorio Veneto”** & **“Littorio”** at anchor in La Spezia, March 1943.



Unknown photographer



The **USS Zumwalt**, is the latest in stealth technology for war ships, making it considerably more difficult to detect by one or more of radar, visual, sonar, and infrared methods.

With the advent of highly sophisticated and technologically advanced stealth ships, traditional painted of camouflage has now become virtually obsolete. A minimal Radar footprint is now the new method of camouflage. The vessels' distinctive appearance results from the design requirement for a low radar cross-section (RCS). The Zumwalt-class has a wave-piercing tumblehome hull, the sides of which slope inward, above the waterline, which dramatically reduces RCS by returning much smaller echo, than from a conventional flare hull designed ship. Image unknown USN photographer

End

References: RN and USN Archives, Imperial War Museum, Various online data available on Public Domains, from which much material has been sourced.

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