Submarines of the Imperial Japanese Navy

Japan had what was easily the most diverse submarine fleet of any nation in the Second World War. These included manned torpedoes, midget submarines, medium-range submarines, purpose-built supply submarines (many for use by the Army), long-range fleet submarines (many of which carried an aircraft), submarines with high submerged speed, and submarines that could carry multiple bombers.

Because of the vastness of the Pacific, Japan built many boats of extreme range and size, many of which were capable of cruises exceeding 20,000 miles and lasting more than 100 days. In fact, Japan built what were by far the largest submarines in the world, indeed, the only submarines over 5,000 tons submerged displacement, or submarines over 400 feet in length until the advent of nuclear power. These same boats were credited with a range of 37,500 miles at 14 knots, a figure never matched by any other diesel-electric submarine. These large boats could each carry three floatplane bombers, the only submarines in history so capable. Japan built 41 submarines that could carry one or more aircraft. While the vast submarine fleets of the United States, Britain, and Germany included not one submarine so capable.

During the Second World War, there were 56 submarines larger than 3,000 tons in the entire world, and 52 of these were Japanese. Japan built 65 submarines with ranges exceeding 20,000 miles at ten knots, while the Allies had no submarine capable of this feat. By 1945, Japan had built all 39 of the world’s diesel-electric submarines with more than 10,000 horsepower, and all 57 of the world’s diesel-electric submarines capable of 23+ knots surface speed.

The Japanese navy also built submarines with the fastest underwater speeds of any nation’s combat submarines. They employed 78 midget submarines capable of 18.5 to 19 knots submerged, and built 110 others capable of 16 knots. As the war was ending they completed four medium-sized submarines capable of 19 knots submerged. This exceeds the 17.5-knot performance of the famed German Type XXI coming into service at the same time. As early as 1938, Japan completed the experimental Submarine Number 71, capable of more than 21 knots submerged.

Japanese submarines employed the best torpedoes available during the Second World War. The Type 95 torpedo used pure oxygen to burn kerosene, instead of the compressed air and alcohol used in other nation’s torpedoes. This gave them about three times the range of their Allied counterparts, and also reduced their wake, making them harder to notice and avoid. The Type 95 also had by far the largest warhead of any submarine torpedo, initially 893 pounds (405 kg), increased to 1210 pounds (550 kg) late in the war. All Japanese torpedoes made during the war used Japanese Type 97 explosive, a mixture of 60% TNT and 40% hexanitrodiphenylamine. Most importantly, the Type 95 used a simple contact exploder, and was therefore far more reliable than its American counterpart, the Mark 14, until the latter was improved in late-1943. Japan also developed and used an electric torpedo, the Type 92. This weapon had modest performance compared to the Type 95, but emitted no exhaust and, therefore, left no wake to reveal its presence. Similar electric torpedoes were used by several nations.
Given their size, range, speed, and torpedoes, Japanese submarines achieved surprisingly little. This was because they were mainly employed against warships, which were fast, maneuverable, and well-defended when compared to merchant ships. Japanese naval doctrine was built around the concept of fighting a single decisive battle, as they had done at Tsushima 40 years earlier. They thought of their submarines as scouts, whose main role was to locate, shadow, and attack Allied naval task forces. This approach gave a significant return in 1942 when they sank two fleet carriers, one cruiser, and a few destroyers and other warships, and also damaged two battleships, one fleet carrier (twice), and a cruiser. However, as Allied intelligence, technologies, methods, and numbers improved, the Japanese submarines were never again able to achieve this frequency of success. For this reason, many argue that the Japanese submarine force would have been better used against merchant ships, patrolling Allied shipping lanes instead of lurking outside naval bases. Bagnasco credits the Japanese submarine fleet with sinking 184 merchant ships of 907,000 GRT. This figure is far less than achieved by the Germans (2,840 ships of 14.3 million GRT), the Americans (1,079 ships of 4.65 million tons), and the British (493 ships of 1.52 million tons). It seems reasonable that an all-out blitz of the American west coast, the Panama Canal, and the approaches to Hawaii, New Zealand, Australia and India would have caused the Allies more difficulty than did the naval deprivations that were actually achieved. Losing a significant number of merchant ships, and also needing to spread meager defenses even more thinly along two coasts, would surely have had some substantial consequences for the United States in 1942.

The Japanese did, of course, make some attacks on merchant shipping in the Pacific and Indian Oceans, but these were the minority of missions. Frequently, they waited for fleets that were never seen, supported spectacularly brave but inconsequential reconnaissance flights, or toted midget submarines about, all of which achieved rather less than was possible with so valuable a resource as the Japanese submarine fleet. Worse from a naval perspective, Japanese submarines were increasingly employed in running supplies to the starving garrisons of isolated islands. The Japanese expended hundreds of sorties in this way, which might have otherwise been used offensively against the Allied war effort. A submarine's cargo capacity was much less than that of a relatively inexpensive freighter. However, Japan was understandably reluctant to let island garrisons starve. Additionally, many practically unarmed submarines (including 26 built for Army use) were built specifically for the supply role, consuming production resources as well.

For their disappointing achievements, Japanese submarines paid heavily. Japan started the war with 63 ocean-going submarines (i.e., not including midgets), and completed 111 during the war, for a total of 174. However, three-quarters of these (128 boats) were lost during the conflict, a proportion of loss similar that experienced by Germany's U-Boats. Most of the surviving boats were either dedicated to training roles or were recently completed and never saw combat. Of those which saw significant combat, the toll was very grim indeed. For example, of the 30 submarines that supported the Pearl Harbor attack, none survived the war.

Compared to German submarines, Japan's huge boats were relatively easy to sight visually and with radar, slow to dive, hard to maneuver underwater, easy to track on sonar, and easy to hit. Japanese hulls were also not as strong as those of German boats, and therefore could not dive as deeply nor survive such rough treatment. Also, they lacked radar until the first sets were installed in June 1944, and never had sets as good as the Allies possessed.

Compounding these deficiencies, Japan was at war with the United States and the United Kingdom, two nations embroiled in a vast conflict with hundreds of U-Boats in the Atlantic, and hence two nations which poured lavish resources into anti-submarine warfare (ASW) research and development. As an example of the fruits of this research, in June 1944 the US Navy sank the I-52 by using code-breaking to discover her schedule, finding her at night with radar-equipped carrier-based aircraft, tracking her underwater with sonobuoys dropped by those aircraft, and sinking her with acoustic homing torpedoes dropped by the same aircraft. The Japanese could achieve none of these technological feats at that
time.

In the face of such disadvantages, morale declined within the Japanese submarine force. This is reflected in a post-war report prepared by the US and British Navies which states, "It was frankly impossible to believe that submarines could spend weeks on the US west coast 'without contacts,' or spend more than 40 days running among the Solomons during the Guadalcanal campaign 'without seeing any targets.' Even the Japanese commanding officers could not disguise their embarrassment when recounting these tales. Further enlightenment is found in the extremely large number of times the target was 'too far away to attack.'"

Sources:


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