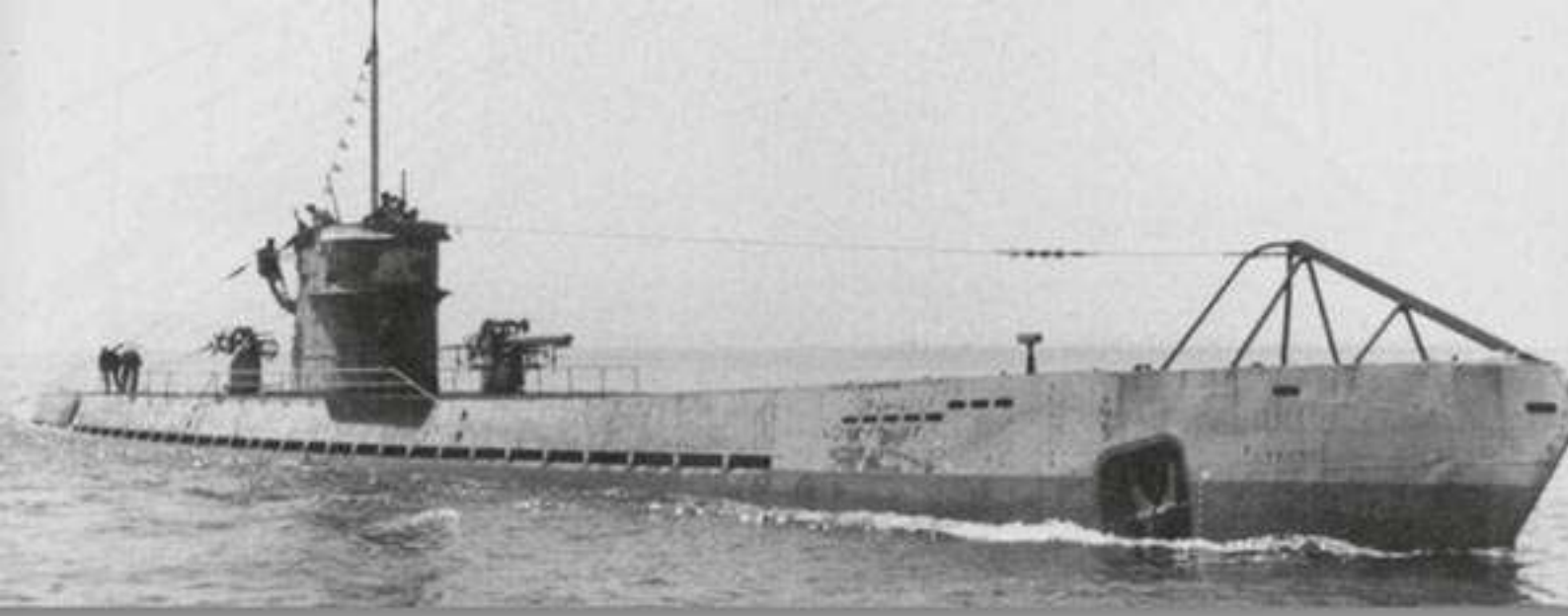


Type IX U-Boat Modifications & Features

Dougie Martindale
Accurate Model Parts

Contents

Part I - Introduction

This article covers the external features of Type IX U-boats, with a particular emphasis placed on the features present on IXAs, IXBs and IXCs in 1940, 1941 and 1942. It is hoped that this may aid a modeller wishing to accurately build an IXC from the early Revell IXC kit (05166) or, as in the case of the author, converting the kit to an IXB. The constant focus of the author's articles is to arm modellers with the tools they need to maintain historical accuracy by depicting a certain boat during a particular time frame. To achieve this they will need to be able to discern what features (such as net cutter or breakwaters) were present or absent on their chosen boat at that point in time. Or, alternatively, this process can be reversed in that the information herein may provide modellers with details to allow a particular boat to be selected. Modellers are now spoiled for choice due to the three different 1/72nd scale versions of the IXC currently available, and it is expected that 1/144th scale versions of these kits may appear in the future to further consolidate the range of options for U-boot modellers.

Using the tables

Tables of features evidenced in period photographs are provided in each section. These provide as much detail as is known by the author at the time of writing. The entries **show the presence or absence** of the feature at a particular month or period of time, **not when the feature was implemented or removed**. We can make certain deductions from these tables when combined with the patrol history of U-boats which are easily accessible to us. For example, the net cutter entry for Aug 40 for U 65 under the "No" column indicates that U 65 did not have a net cutter in a photograph taken in August 1940. An entry under the "yes - serrated" column for late 1940 for U 65 indicates that U 65 was fitted with a net cutter with serrated edge in a photograph taken in late 1940. The researcher can then look at the patrol history of U 65 to try to deduce when the net cutter was fitted. U 65's third patrol ended on 19/08/40 and the fourth patrol began on 28/08/40, meaning that

the boat was available for refit (refit A) between those times. U 65's fourth patrol ended on 25/09/40 and the fifth patrol began on 15/10/40, meaning that the boat was available for a three-week refit (refit B) during this time. For the net cutter to be absent in August 1941 and present in late 1940, it would have to be fitted in either refit A or refit B.

As mentioned above (and many, many times in the past), if a modeller wishes to make accurate model they need to know the features that were or were not present on their chosen boat during a certain time period. To try to do this, we can analyse the tables for all boats over time and make certain assumptions when patterns become evident. It is admitted that these are **assumptions** which are limited to the amount of research material presently available to the author. However, modellers require such information so an attempt must be made as best as possible with the period photos that are available at present. It is also admitted that the dates in the tables are often based on captions within books and cannot be guaranteed in every case. The author has made a judgement on which books can generally be trusted on the identity of the boat number and the date given in the caption. Books which cannot discern a Type IX from a Type VII obviously cannot be relied upon when it comes to a boat number or date. The dates and boat numbers in the tables in this article are considered to be generally reliable rather than absolutely guaranteed. Despite the limitations, this approach has been taken because if we were to only use information from the very finest publications then we would simply not have enough information to discern any patterns or make any general conclusions about features.

Nomenclature

The first eight IXs (U 37 to U 44) were the original Type IXs, which technically do not have the A suffix. Generally, over time, these eight U-boats have been referred to as the Type IXAs despite this nomenclature being technically incorrect. In some cases, we might refer to any boat in this class (it could be an IXB or IXD2) as a Type IX but this can cause confusion with the original IXs (IXAs). To make it clear whether we are talking about a Type IX of any variant, or an original IX (IXA), the first eight boats in this article will be referred to as IXAs. When the author writes of a Type IX, this is in regard to a boat of any variant (IXA, IXB, IXC, IXC/40, IXD1, IXD2 or IXD2/42).

The author will refer to IXCs and IXC/40s as simply IXCs in the text for streamlined readability and due to there being no external difference of consequence to the modeller. In regard to the various styles of the multiple features, the style numbers have been attributed as per chronological order by the author and are in no way official.

Type IX variants

Type IX variants and batches commissioned into the Kriegsmarine			
Variant	**Number commissioned**	**Numbers in separate batches**	**Length (metres)**
IXA	8	U 37 - U 44	76.5
IXB	14	U 64 - U 65, U 103 - U 110, U 111, U 122 - U 124	76.5
IXC	54	U 66 - U 68, U 125 - U 131, U 153 - U 166, U 171 - U 176, U 501 - U 524	76.76
IXC/40	87	U 167 - U 170, U 183 - U 194, U 525 - U 550, U 801 - U 806, U 841 - U 846, U 853 - U 858, U 865 - U 870, U 877 - U 881, U 889, U 1221 - U 1235	76.76
IXD1	2	U 180, U 195	87.6
IXD2	28	U 177 - U 179, U 181 - U 182, U 196 - U 200, U 847 - U 852, U 859 - U 864, U 871 - U 876	87.6
IXD2/42	1	U 883	87.6

As well as the 194 boats in the table that were commissioned into the Kriegsmarine, others were partially built and cancelled while under construction. For example, the IXD2/42 U 884 was launched, sunk by air attack and not repaired.

Early Type IXs

It is well known that the Kriegsmarine deliberately numbered U-boats out of sequence. Researchers and modellers will know that U 505 was operating earlier than U 190, as was U 552 compared to U 250. What is less well known is that the first IXD was launched before many IXCs and that some IXC/40s were launched before some IXCs. This becomes evident when scanning through the table in Part X which shows the Type IXs in order of launch date. Given that Part II of this article pays particular attention to the features on the very earliest Type IXs, the launch order of the IXAs, IXBs and earliest IXCs are provided below as they are directly relevant to the debates which follow.

Early Type IXs in order of launch			
Boat	**Variant**	**Shipyard**	**Launch date**
U 37	IXA	A G Weser, Bremen	14/05/38
U 38	IXA	A G Weser, Bremen	09/08/38
U 39	IXA	A G Weser, Bremen	22/09/38
U 40	IXA	A G Weser, Bremen	09/11/38
U 41	IXA	A G Weser, Bremen	20/01/39
U 41	IXA	A G Weser, Bremen	20/01/39
U 42	IXA	A G Weser, Bremen	16/02/39
U 44	IXA	A G Weser, Bremen	05/08/39
U 64	IXB	A G Weser, Bremen	20/09/39
U 65	IXB	A G Weser, Bremen	06/11/39
U 122	IXB	A G Weser, Bremen	30/12/39
U 123	IXB	A G Weser, Bremen	02/03/40
U 124	IXB	A G Weser, Bremen	09/03/40
U 103	IXB	A G Weser, Bremen	12/04/40
U 104	IXB	A G Weser, Bremen	25/05/40
U 105	IXB	A G Weser, Bremen	15/06/40
U 106	IXB	A G Weser, Bremen	17/06/40
U 107	IXB	A G Weser, Bremen	02/07/40
U 108	IXB	A G Weser, Bremen	15/07/40
U 109	IXB	A G Weser, Bremen	14/09/40
U 110	IXB	A G Weser, Bremen	25/08/40
U 111	IXB	A G Weser, Bremen	06/09/40
U 66	IXC	A G Weser, Bremen	10/10/40
U 67	IXC	A G Weser, Bremen	30/10/40
U 68	IXC	A G Weser, Bremen	22/11/40
U 125	IXC	A G Weser, Bremen	10/12/40
U 126	IXC	A G Weser, Bremen	31/12/40
U 501	IXC	Deutsche Werft, Hamburg	25/01/41
U 127	IXC	A G Weser, Bremen	04/02/41
U 502	IXC	Deutsche Werft, Hamburg	18/02/41
U 128	IXC	A G Weser, Bremen	20/02/41
U 129	IXC	A G Weser, Bremen	28/02/41
U 161	IXC	Seebeckwerft, Bremerhaven	01/03/41
U 162	IXC	Seebeckwerft, Bremerhaven	01/03/41

U 163	IXC	Seebeckwerft, Bremerhaven	01/05/41
U 164	IXC	Seebeckwerft, Bremerhaven	01/05/41
U 130	IXC	A G Weser, Bremen	14/03/41
U 131	IXC	A G Weser, Bremen	01/04/41
U 153	IXC	A G Weser, Bremen	05/04/41
U 503	IXC	Deutsche Werft, Hamburg	05/04/41
U 195	IXD1	A G Weser, Bremen	08/04/41
U 154	IXC	A G Weser, Bremen	21/04/41
U 504	IXC	Deutsche Werft, Hamburg	24/04/41
U 155	IXC	A G Weser, Bremen	12/05/41
U 156	IXC	A G Weser, Bremen	21/05/41
U 505	IXC	Deutsche Werft, Hamburg	24/05/41
U 157	IXC	A G Weser, Bremen	05/06/41
U 506	IXC	Deutsche Werft, Hamburg	20/06/41
U 158	IXC	A G Weser, Bremen	21/06/41
U 159	IXC	A G Weser, Bremen	01/07/41
U 160	IXC	A G Weser, Bremen	12/07/41
U 507	IXC	Deutsche Werft, Hamburg	15/07/41
U 508	IXC	Deutsche Werft, Hamburg	30/07/41

Type VII U-boats were produced from a variety of shipyards in various locations in Germany. By contrast, all 194 IXs were built in only three yards: *A G Weser* in Bremen, *Deutsche Werft* in Hamburg, and *Seebeckwerft* in Bremerhaven. It may be said that the difference between IXCs and IXC/40s are immaterial to modellers as no external difference is discernible. There are minor differences in vent patterns and tower grills between IXBs and IXCs / IXC/40s but it is difficult - perhaps impossible - to tell the difference between Type IXBs, IXCs and IXC/40s when looking at the hull and tower shape alone. It is true that the Type IXBs were very slightly shorter than IXCs / IXC/40s but this difference can only be determined on a model by measuring the length with a tape. For this reason, it is suggested that Revell's existing early war IXC model kit (05166) can be successfully converted to an IXB model. Indeed, much of the initial research within this article was developed when designing an AMP photo-etch set to convert the early war Revell IXC to an IXB. Ultimately the convert set was cancelled but the research involved in the project has been used as the main basis of this article.

Part II - Early Tower Features

This section will discuss many of the features found on the tower of early Type IXs. Only the Type IXAs were operating prior to hostilities in September 1939.

Pre-war and early war features

Removal of pre-war features - In late August 1939, many U-boats left to take up positions at sea in readiness for the commencement of hostilities. Knowing that the war was to start, the Germans made the following changes before the boats left on patrol and these were applicable to the Type IXAs -

- large U-numbers painted over.
- oval bow plates removed.
- bronze eagle plaque removed.
- identification markings on the lifebelts and lifebuoys painted over.

- red and white emergency rescue buoy on foredeck painted black.

Rescue buoy removal - The rescue buoy on the foredeck was retained by the IXAs, and the early IXBs such as U 64, U 106 and U 108, in the early war period. The buoy on the foredeck was probably moved inside the hull casing in late 1940, or early 1941 at the latest.

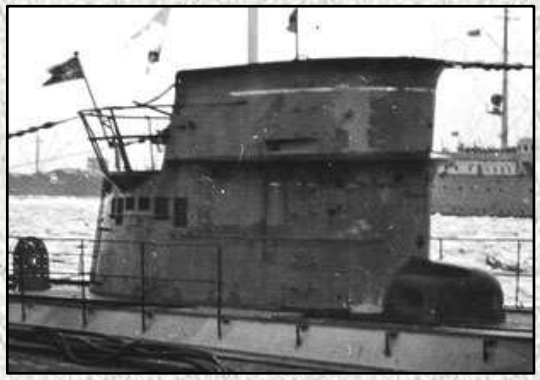
Wind and spray deflectors - The wind deflector flange was at the top of the outside edges of the tower whereas the spray deflector was present roughly halfway up the front of the tower. The IXBs, IXCs and IXDs were fitted with wind deflectors and spray deflector throughout their careers. The IXAs were commissioned without either of these features and fitted at a later point in time. The following table shows the deflector combinations on the towers of Type IXAs -

Evidence of deflectors in early IX photographs			
Boat	**Spray no + wind no**	**Spray yes + wind no**	**Spray yes + wind yes**
U 37	Pre-war	Wartime (long spray)	Apr 40 (long spray)
U 38	Pre-war		Wartime (long spray)
U 39	Pre-war		Wartime (long spray)
U 40	Pre-war	Oct 39 (short spray)	
U 41		Pre-war (short spray)	
U 42		Pre-war (short spray)	
U 43			Pre-war (short spray)
U 44		Wartime (short spray)	
U 64			Dec 39 (short spray)

Right (1): A pre-war Type IXA with no spray deflector, no wind deflector, a shallow curve to the top edge and bronze eagle plaque. The white pre-war number would have been on the side of the tower and is just out of shot.

Clearly the first four IXAs were commissioned with no spray deflector and no wind deflector. U 37 and U 41 (and perhaps others) were then fitted with a spray deflector prior to hostilities. Both boats did not have a wind deflector at this time, which is an indicator that the spray deflector preceded the wind deflector on these boats. On U 37 the combination of spray but no wind deflector continued into the earliest stages of the war. An exception can be found on U 43 which actually had both deflectors prior to the start of the war. Given the knowledge from other U-boat features, we know that features were often tested upon one or more boats before fleet-wide implementation. It would appear that U 43 was the boat chosen for the testing of both these features.

Pre-war photos taken between the summer and autumn of 1939 show that U 41 had a spray deflector and no wind deflector at the very same time as when U 37, U 38 and U 39 had no deflectors. From this we may conclude that the spray deflector was added on U 41 before U 37, U 38 and U 39. This should not be surprising as we would not expect the spray deflector to be added simultaneously to all boats in the fleet.



Above (2): A full length spray deflector is in place on this wartime IXA but the top of the tower still does not yet have a wind deflector.

A wind deflector was fitted as early as October 1939 on U 40. It was present on the first IXBs U 64 and U 65 when commissioned in December 1939 and February 1940 respectively. With the exception of U 43, we might speculate that the wind deflector was added from late 1939 onwards. On Type VIIs the wind deflector has been evidenced in photos as early as November 1940 (perhaps for test purposes) and was fitted progressively over a lengthy period throughout 1941. The fitting date for the IXs is clearly very much earlier than VIIs but the reason for the delayed implementation on VIIs is unclear.

From the above discussion we might conclude that -

- the spray deflector tended to precede the wind deflector.
- the spray deflector was added before the beginning of hostilities in September 1939.
- the wind deflector was added in the early war period from around the end of 1939 (except U 43).
- the wind deflector was added to Type IXs much earlier than was the case with Type VIIs.

Spray deflector length - There is an additional complication: not all spray deflectors were the same length. As can be seen in the table on the previous page, the first three boats - U 37, U 38 and U 39 - all had the long spray deflector extending all the way to the rear edge of the tower bulwark. All other boats from U 40 onwards had a shorter spray deflector, as can be seen on the tower profiles which follow.

Tower top edge - The top edge of the tower curved out to a lesser degree on the VIIAs and early VIIBs than on the later VIIBs and VIICs. This is likely to be the case on the IXAs compared to later sub-variants as the IXAs resemble the VIIAs in curving out to a lesser degree. It is difficult to compare this with IXBs and IXCs because they were all completed with a wind deflector which hides the degree of curve.

Above (3): U 37 later in her career, with a full length wind deflector and full length spray deflector. The seven extra rungs can be seen in the very centre of this image.

IXA tower rungs - The IXAs originally had no tower rungs at all. On the port side there were only two horizontal railings and these were at the same level. There were two horizontal railings on the starboard side but the rear one was higher up. Early in the war, seven rungs were added to the towers of U 37, U 38 and U 39 ahead of the navigational light channels on each side; this consisted of three rungs added above the spray deflector and four added below the spray deflector per side. This feature was not added to U 43.

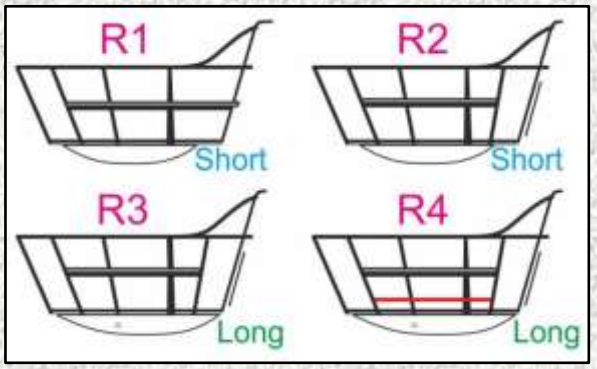
20mm on tower - Originally the 20mm was not considered to be waterproof, with only the mount

being permanently in place. The barrel was stored below and only added to the mount when the weapon was to be used. This changed from early spring 1940 when a waterproof 20mm MG C/30 anti-aircraft gun was added to operational boats. U 64 did have the waterproof barrel in place in April 1940 but U 123, U 124 and U 103 did not have a barrel in place during their commissioning ceremonies in May 1940, June 1940 and July 1940 respectively. It is surely the case that operational boats were fitted with the waterproof 20mm before boats in training.

Tower railing styles

As covered below, there were minor differences in the tower railings between the early IXs.

- Railing style R1
  - Short underside with no insulating conduit
  - Wooden seat extends all the way to the bulwark edge (access to tower **not** permitted)
  - 7 verticals
  - 2 horizontals
  - No grip bar on tower
  - Boats: All pre-war IXAs, some wartime IXAs (including U 37, U 39, U 40 and U 43)



Above (4): The four styles of tower railings on the early Turm 0 style towers. The red bar is the only difference between R3 and R4. Note the grip bar was not required on R1 as crewmen were not able to climb from the deck on this area. The circle on the underside is an insulating conduit. A thin wire ran from this conduit to the aft jumping wire.

- Railing style R2
  - Short underside with no insulating conduit
  - Wooden seat does **not** extend to the bulwark edge (access to tower permitted)
  - 9 verticals
  - 2 horizontals
  - Grip bar on tower
  - Boats: Some wartime IXAs (including U 38, U 43 and U 44)

- Railing style R3
  - Long underside with insulating conduit
  - Wooden seat does **not** extend to the bulwark edge (access to tower permitted)
  - 9 verticals
  - 2 horizontals
  - Grip bar on tower
  - Earliest IXBs (U 64, U 65, U 122, U 123, U 124, U 103)

- Railing style R4
  - Long underside with insulating conduit
  - Wooden seat does **not** extend to the bulwark edge (access to tower permitted)
  - 9 verticals
  - 3 horizontals
  - Grip bar on tower
  - Extra horizontal bar near bottom
  - Later IXBs (U 104 - U 111), all IXCs and IXDs

Style R1 - Style R1 was used upon all the IXAs in the pre-war period. At this time crewmen were required to use the ladder at the rear of the tower to gain access to the very end of the tower. There was a space ahead of the rearmost vertical stanchion (on either side) to allow a crewman to squeeze

through the tower railings from the ladder below. The wooden seat and horizontal support beneath was in place from the vertical stanchion just ahead of this gap all the way forward to the tower bulwark. On R1 there was no space for a crewman to climb up from the deck just behind the bulwark to the tower floor ahead of the 20mm mount. Given that crewmen were not able to climb at this position, there were no tower grips or rungs to facilitate climbing up here.

Style R2 - Style R1 was deemed to be unsatisfactory. On style R2 and subsequent styles, a gap was built into the position behind the bulwark to allow a crewman to climb up in this position and not have to use the ladder at the rear. Rungs and grips were added to the sides of the tower to allow a crewman to scale the tower at this location. An additional vertical stanchion was added behind this gap and a new, shorter wooden seat was added over to this new stanchion. A long, near vertical grip bar was added close to and parallel to the edge of the bulwark edge so that crewman could haul themselves up and through the new gap. Style R2 was not originally fitted to any boats and was a modification of the existing R1 style on some IXAs. It is not known if all IXAs were changed from R1 to R2 before they were lost to enemy action.

Style R3 - Style R3 was used on all the early IXBs. The railings were the same as R2, with the only exception being that the short supporting curve typical of IXAs was lengthened on the IXBs, IXCs and IXDs.

Style R4 - From U 104 onwards, an additional horizontal bar was added near the bottom of the tower railings. This became the standard style (style R4) and was used on the later IXBs (U 104 to U 111) and all the IXCs and IXDs. The addition of the horizontal bar was not deemed to be important enough to be retrofitted to earlier IXBs. Therefore the boats kept their railings styles until they were sunk, retired from service or the towers were changed to the later Turm II standard (the later towers Turm II and Turm IV will be discussed in Part XII)..

It should be noted that there would often be a metal link chain in between the bulwark edge and the first vertical stanchion on styles R2, R3 and R4. This could be unlinked to permit a crewman to pass through the gap when climbing up the tower. There was only one long wooden seat per side, as opposed to the individual seats on the early Revell kit. A final point is that the outermost vertical stanchion on each side was wider and stronger than the others. This stanchion was of wider diameter at the bottom rather than being a uniform thickness.

Lower air intakes

The U-boats in the pre-war period - the Type Is, IIs, VIIAs, VIIBs and IXAs - had air intakes arranged in patterns of circular holes cut into the sides of the lower half of the tower. Although the pattern differed between sub-variants (and indeed between different boats of the same sub-variant), the characteristic style of the intake holes was the same in that the first hole in the second row was positioned directly under the space between the first and second hole in the first row. Additionally, there were typically groups of holes separated by a vertical gap. On the earliest IXAs there were a very large number of these circular holes (in excess of 2,400 holes!), with no fewer than seven groups of holes on the starboard side alone. This arrangement was deemed to be insufficient on the Type IXs, presumably due to the huge number of holes required. The existing IXAs had this arrangement removed in favour of several grills with horizontal bars. The grills were removable and this permitted changeability until the ideal arrangement could be found.

This horizontal grill arrangement became standard throughout the IX fleet and continued to be used on all subsequent IX variants. This widespread usage suggests that the new arrangement was deemed to be satisfactory; if deemed unsatisfactory it would have been replaced with a superior arrangement. Despite this apparent success on the IXs, the grill arrangement on the lower half of the

tower was limited to Type IXs and the old round groupings continued to be used on other types.

There was a difference in respect to the two grills lower down. On the IXAs, IXBs and the *Deutsche Werft* IXC U 505, there were eight horizontal bars arranged with equal distance between the bars and no gap at the bottom. On the other IXCs built at *A G Weser* in Bremen, and from U 506 onwards, the number of bars was the same but a significant gap appeared beneath the lowest bar. This gap became the standard for all the IXCs built from this point onwards. It is presumed that the earlier *Deutsche Werft* boats before U 505 (U 501, U 502, U 503 and U 504) and possibly the earliest *A G Weser* boats (U 66, U 67, U 68 and U 125 onwards) would have had the original style without the gap at the bottom but presently there is no photographic confirmation of this. It is known that U 128 did have the large gap at the bottom.

Upper air intakes

The other form of tower air intake was present on the upper half of the tower on Type VIIs and IXs. The modifications made to the early VIIB and VIIC air intakes are relevant here as they inform the type of similar modifications that would be made to the Type IXs. Type VIIBs had a particular issue with air intakes, with boats such as U 47 adopting a grill with vertical bars below the 20mm in addition to the round holes. This VIIB arrangement in early 1940 was clearly unsatisfactory and did not feature for long. It was discontinued in favour of large L-shaped lateral trunks which had a criss-cross grill near the top of the tower. Introduced in mid-1940, the crucial point about these trunks is that they raised the intake up higher away from interruption from waves. However, the L-shaped trunks were large, heavy and presumably reduced hydrodynamic efficiency. In 1941 they were removed on the existing VIIBs in favour of a single teardrop-shaped fairing situated behind the attack periscope housing. By contrast, the design of Type VIICs featured narrower air intakes on either side of the inside of the rear of the tower walls. The earliest boats (U 69 to U 72, U 93 to U 98, U 551 - U 557) featured a grill high up the vertical walls on the outside of the tower (slat grill); the rest of the VIICs featured a criss-cross grill (mesh) on the horizontal surface of the tower bulwark (mesh grill).

We see a similar story with the IX class in regard to progressive modifications made to the air intakes. In terms of nomenclature, the terms slat grill and mesh grill were used by the author in previous articles on Type VIICs. These terms have been deliberately avoided in regard to the Type IXs so they are not confused with the style employed on Type VIICs. Instead letters have been assigned chronologically by the author in relation to the different styles on IXs. The chronologic order of IXC grills are not known so the numbers associated with style Z1 to Z4 as not chronological in nature.

Style W - In the pre-war period, all the IXAs and the earliest IXBs (U 64, U 65, U 122, U 123 and U 124) did not have any air intake evident in the top half of the tower. Presumably the large numbers of holes in the lower half of the tower were used as the sole source of air intake. These early boat all changed over to style X by the summer of 1940.

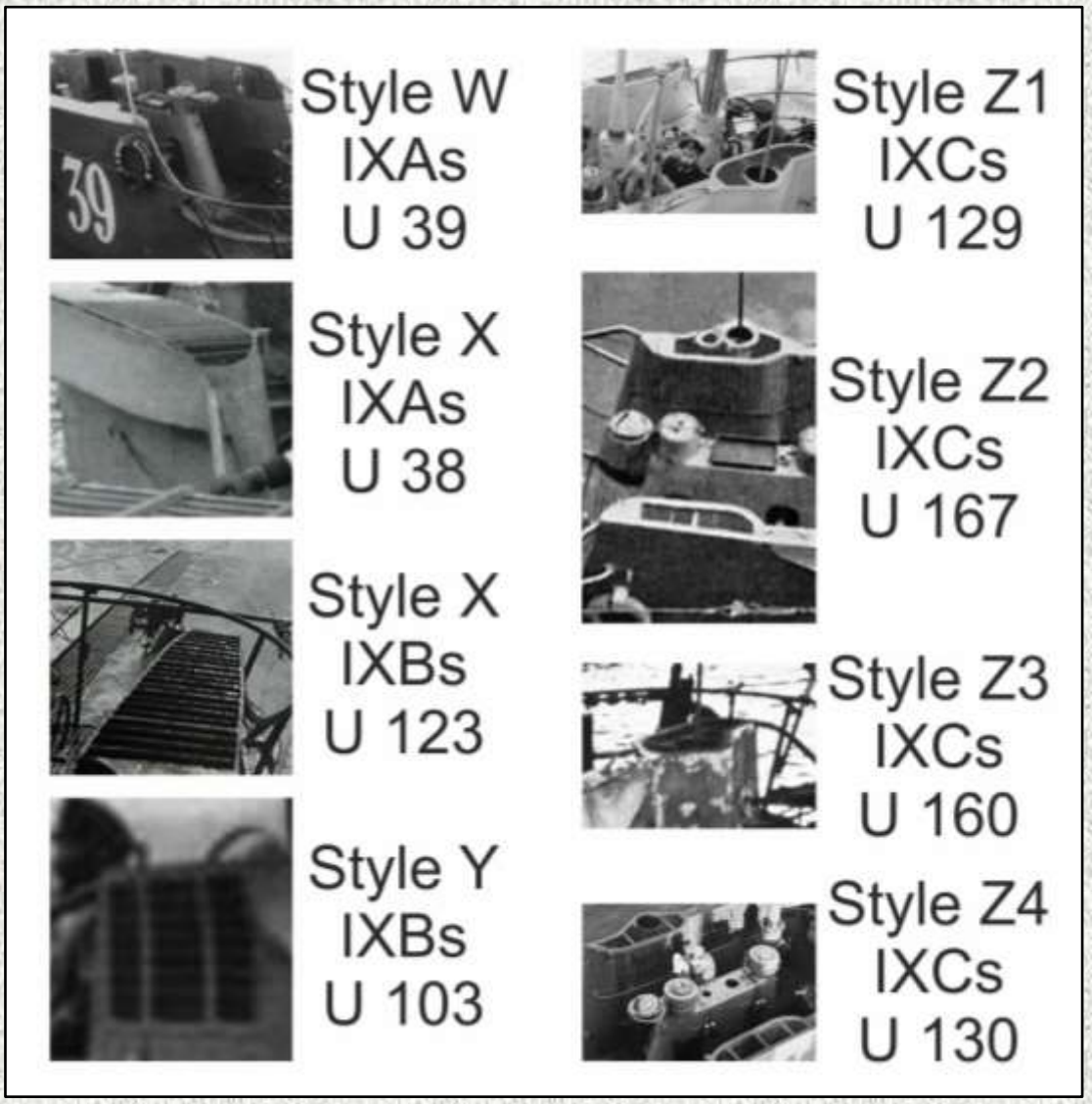
Style X - The IXAs were modified to have a grill with bars at the top of the tower (on the **horizontal** surfaces), with U 38 having this process completed before the commencement of hostilities. The early IXBs (U 64, U 65, U 122, U 123 and U 124) also featured this same arrangement. None of these boats had the periscopic rod aerial and fairing which had yet to be introduced to the fleet.

Style Y - The rest of the IXBs (U 103 to U 111) all had style Y which featured a triple grill (three sets separated vertically) very close to the top of the top of the tower on the **vertical** surfaces. The horizontal surface at the top of the bulwark was blank. Although the size and shape differed, style Y was the equivalent to the slat grill on VIICs such as U 96 and U 552.

On U 108 to U 111 there was a periscopic rod aerial and fairing built into the port side of the tower. This necessitated splitting this triple grill into three separate grills on the port side; the starboard side remained the same.

Note: U 105 had style Y on the top of the sides removed at some point, presumably in favour of style Z which would have been standard at the time.

Style Z - Style Z was the final style and this became standard on all IXCs. It is the equivalent of the mesh grill on the majority of VIICs, which was also the final style in that sub-variant. Style Z must have been required due to style Y being considered unsatisfactory in some respects. When designing style Z, the Kriegsmarine went back to having a grill on the horizontal surface at the top of the bulwark as per style X. Although style X had bars, the grill for style Z was a criss-cross mesh. There were slight differences in the design of this criss-cross mesh grill, for example Z3 was divided into several sections. Z1 and Z2 are very similar, with Z2 having an extra circle on the port grill. It is likely there were other variations in photographs presently unavailable to the author.



Above (5a-5h): The various styles of air intakes on Type IXs. Given are the sub-variants each style was applied to and the individual U-boat shown in each photo. Style Z3 on the **starboard** side was very similar to Z4.

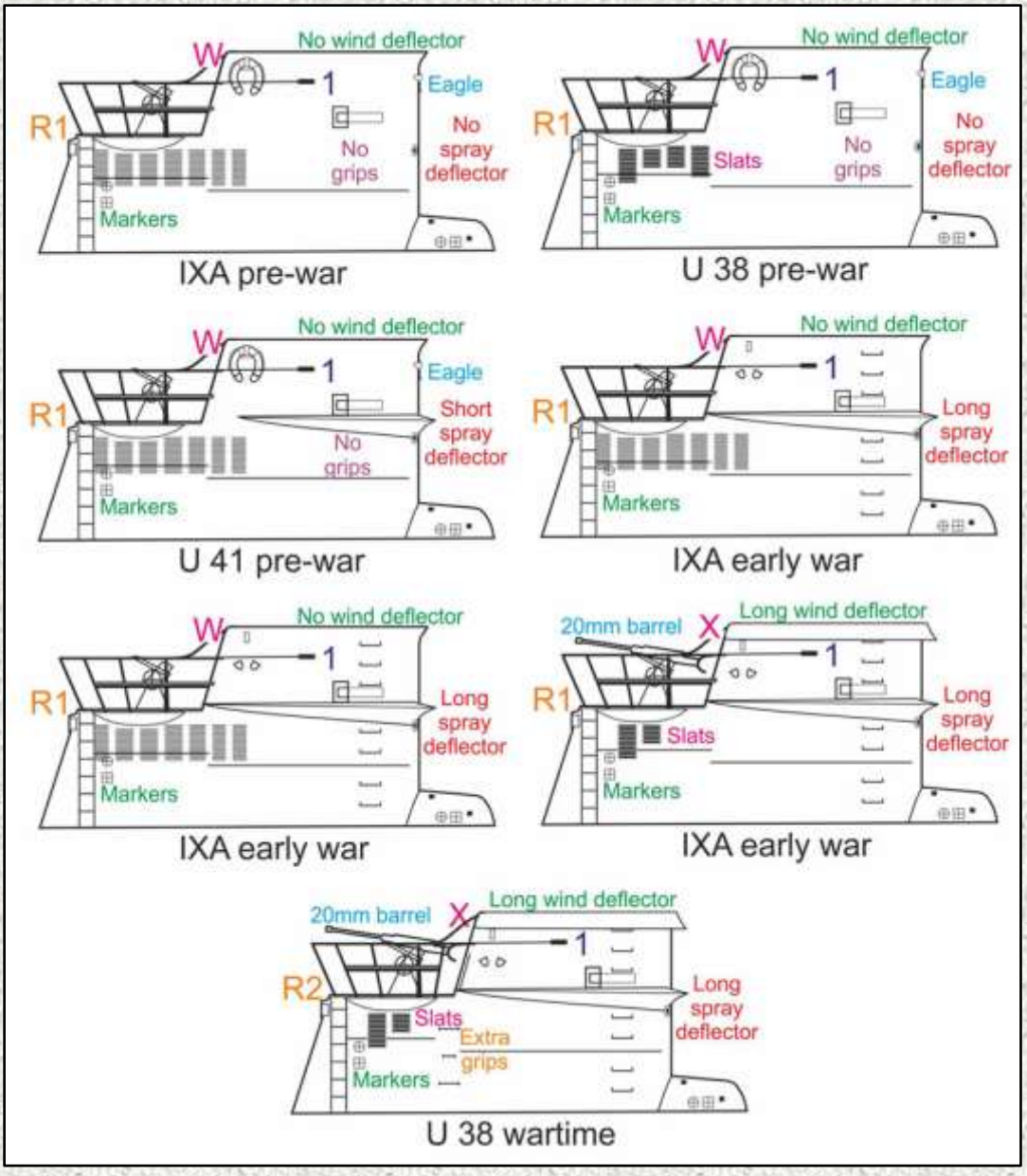
Horizontal grill style on Type IXCs			
Style Z1	**Style Z2**	**Style Z3**	**Style Z4**
U 66, U 68, U 126, U 128, U 129, U 509	U 162, U 167	U 155, U 156, U 160, U 187	U 130, U 177

Above (6): The port side of U 108 in December 1941, showing how style Y was separated into three sections due to the curved periscopic rod aerial fairing. Note the feature towards the bottom left of this image; this includes a door with a square marker plus two square vents to allow water to drain in and out. This feature was present in some IXBs and all IXCs.

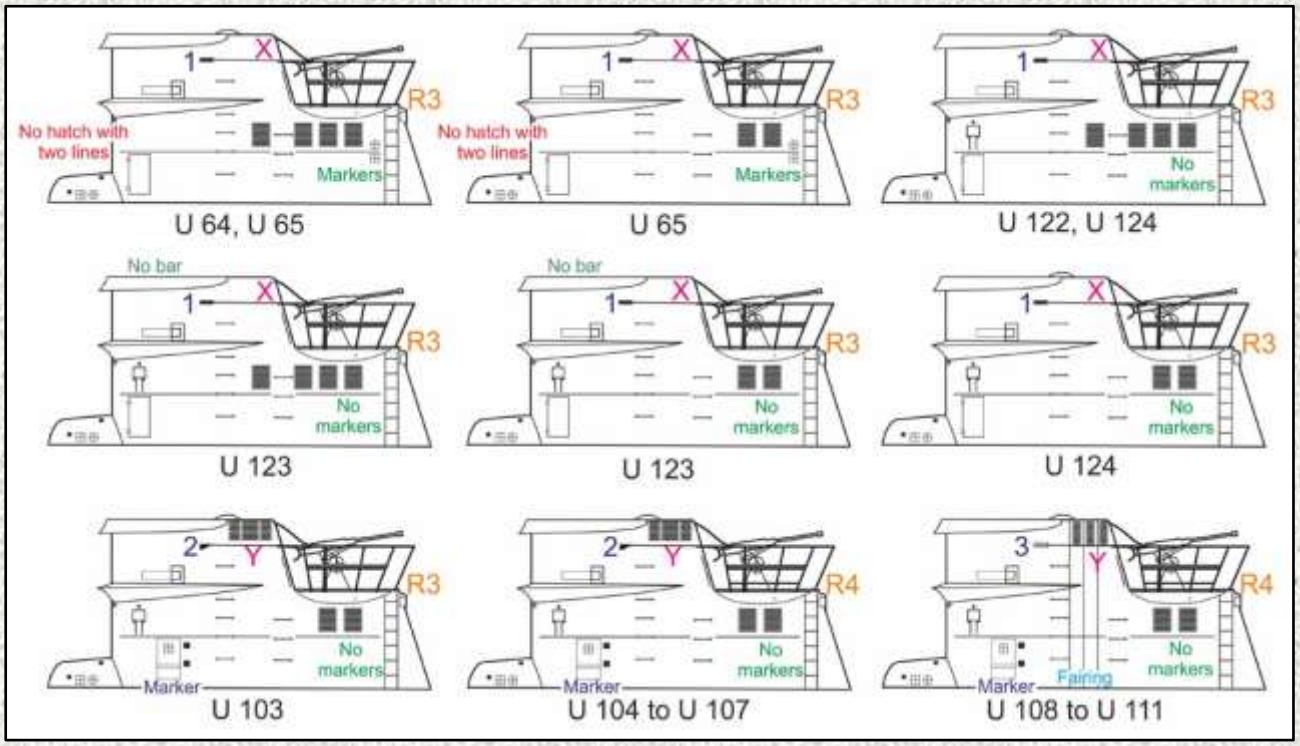
Above (7): Style Z1 on U 129 in April 1942 clearly shows the criss-cross mesh grill and the periscopic rod aerial in the raised position.

Tower profiles

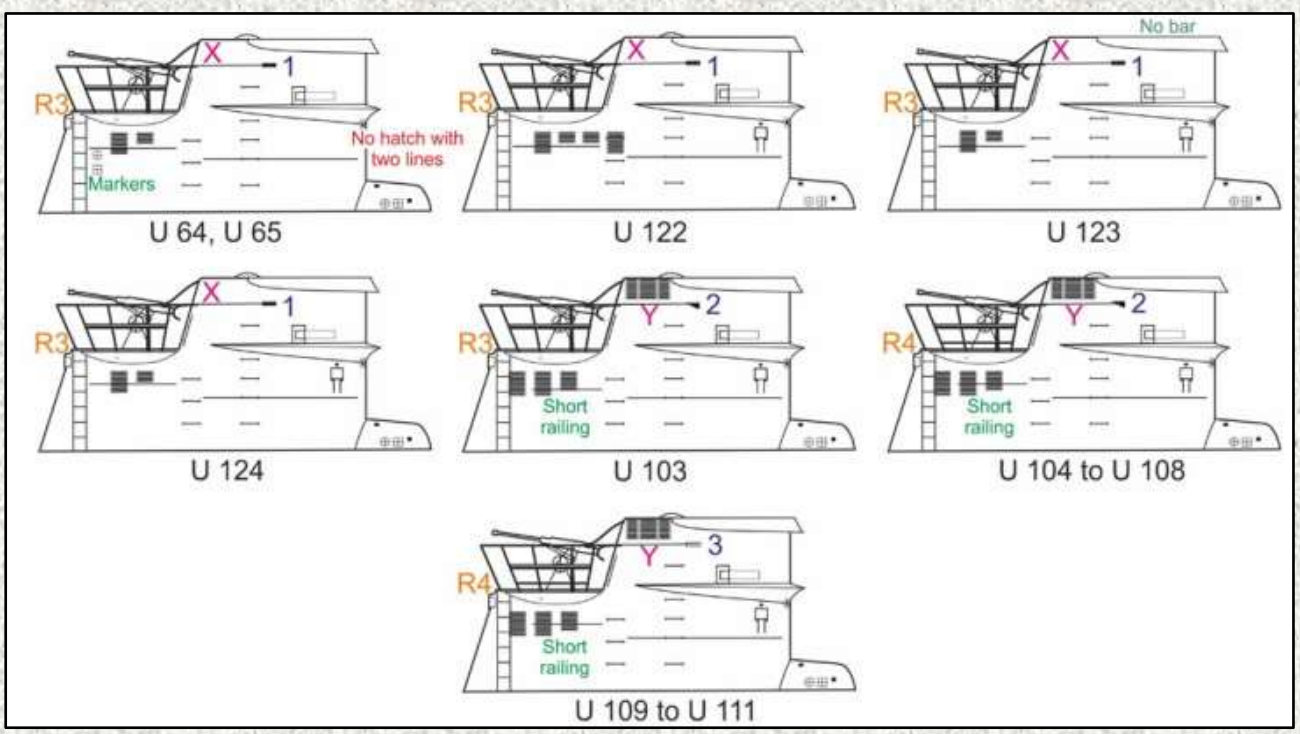
Note: The hatches which are discussed later have been added to the tower profiles; other hatches have been deliberately omitted for simplicity.

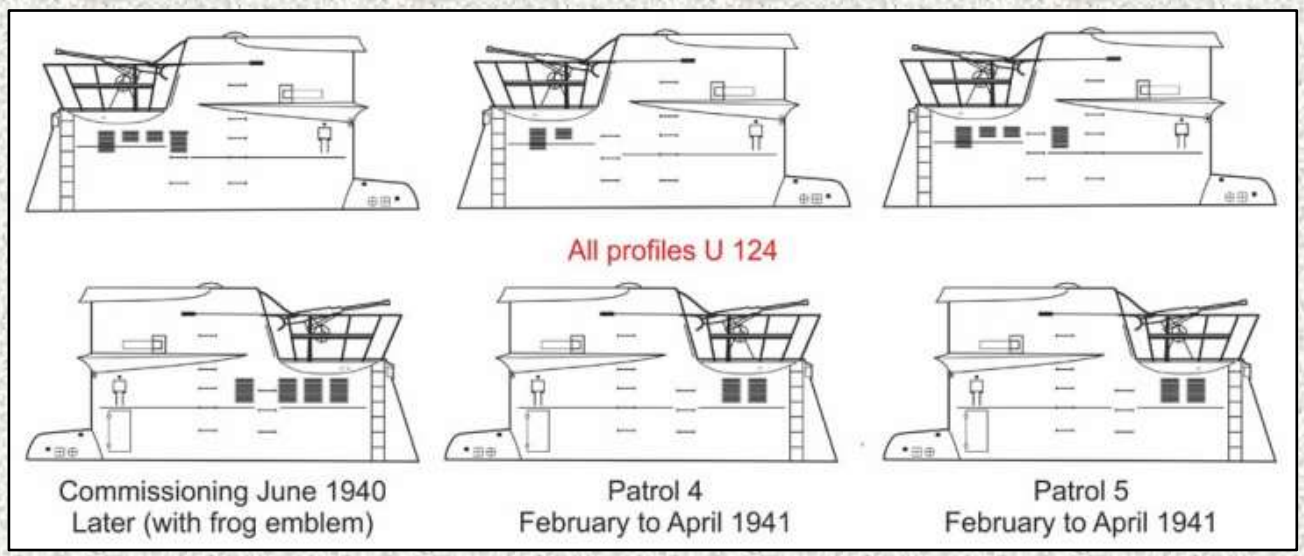


Above (8): Seven tower profiles for Type IXAs in the pre-war and early-war period. On the first profile we see seven groups of round intake holes separated by six vertical gaps. There are a total of 1,232 holes on starboard side alone. Other features are the short and long spray deflectors halfway up the front of the tower and the long wind deflector at the top of the tower. The circle and cross and square and cross markers ahead of the ladder on both sides was a feature exclusive to IXAs and the very earliest IXBs. Note the extra grips added to the tower when railing style W was changed to railing style Y. This allowed crewmen to climb up and squeeze through the gap to gain access to the tower floor ahead of the 20mm. Lastly, we can see that the waterproof 20mm barrel was not initially employed on IXAs, with only the mount being typically seen in the pre-war and very early war period.

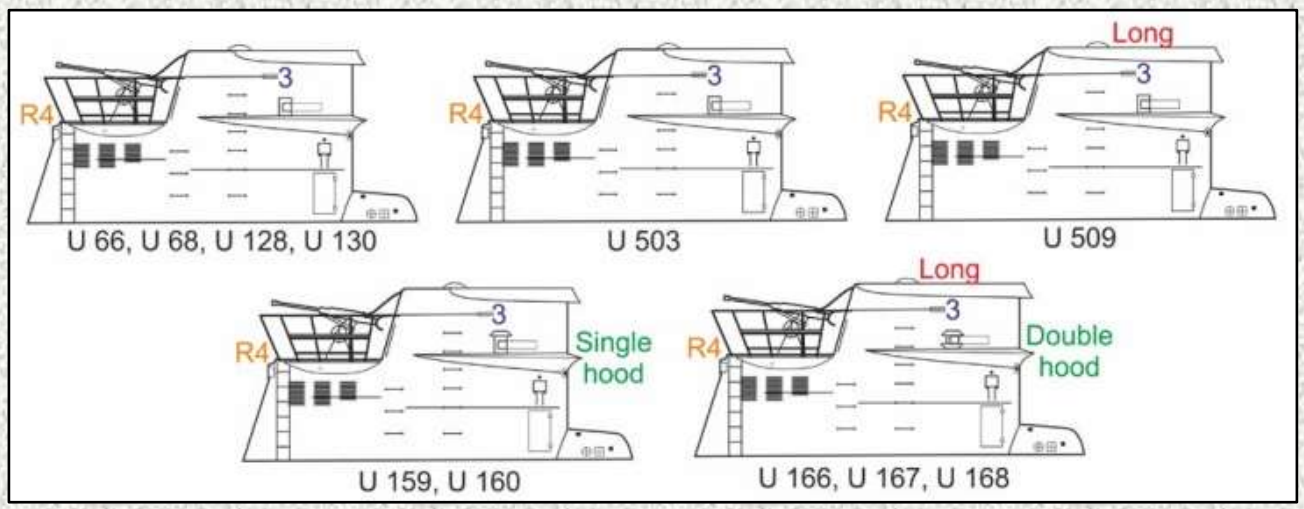


Above and below (9 and 10): The first IXBs - U 64 and U 65 - had only two small grills plus the square and circle markers near the ladder. U 122, U 123 and U 124 were the same as U 64 and U 65 but did not have the markers. The number of grills lower down varied over time. The later IXBs all had three grills lower down plus style Y higher up. U 123 did originally have the curved grip bar at the top of the bulwarks but this was removed in 1940. The later IXBs (U 103 to U 111) introduced two square vents and a large door with square marker near to the front on the port side. This became standard on the IXCs, as did the two grills lower down. The rear horizontal railing can be seen to be higher up on the starboard side compared to the port side.

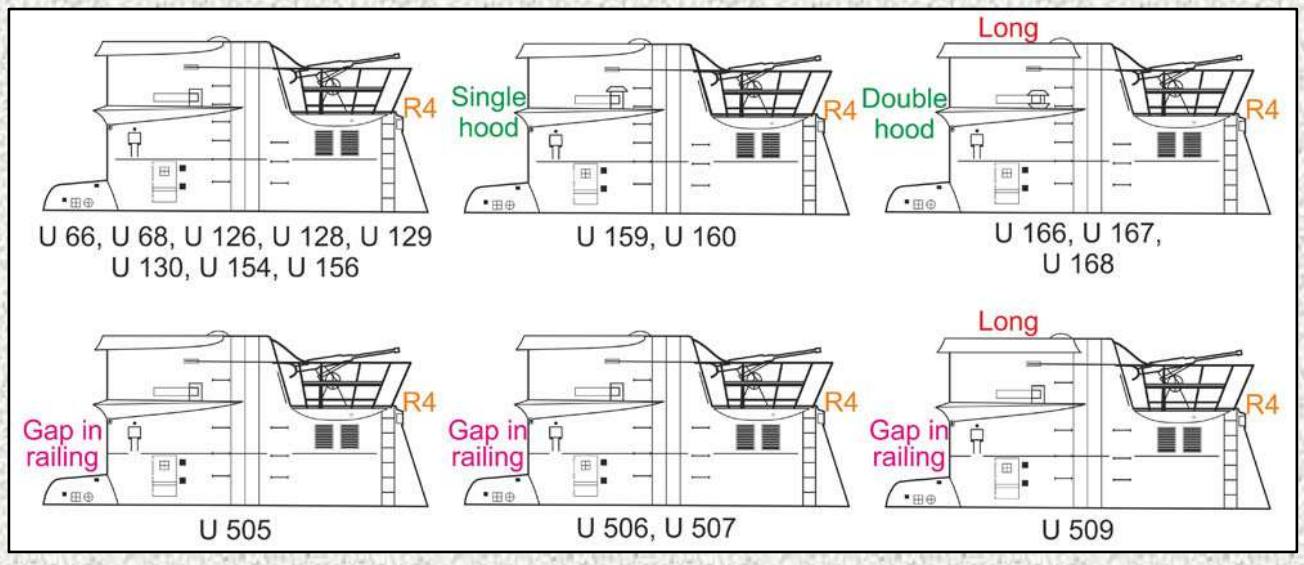




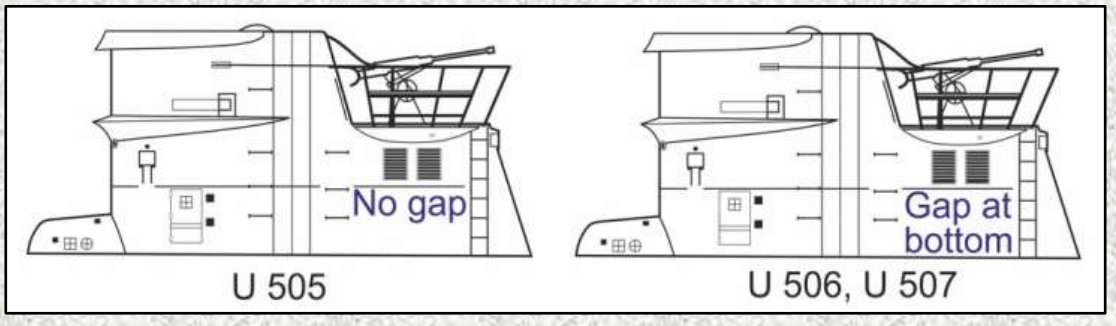
Above (11): These profiles show that grills lower down on U 124 varied greatly. Presumably the grills were easily interchangeable to make their removal or fitting easier. It took time before the Kriegsmarine determined how many grills were required for the Type IXs and this was part of a wider problem that both the IXs and VIIs experienced with air intakes.



Above (12): The starboard profiles for early IXCs. The grills lower down tended not to vary between the IXCs, with three groups on the starboard side and two on the port side. It is suggested that the Kriegsmarine had realised that these were adequate following experimentation on earlier boats. The grab rails differed between shipyards; the *Deutsche Werft* boats built in Hamburg (U 501 onwards) were like the IXBs with one above the spray deflector whereas the others had two grab rails. Another difference which can be seen is the longer wind deflector on some boats.



Above (13): Other differences from IXC photos include a single hood being added above the navigational light on U 159 and U 160. This was an interim solution and was only implemented upon a few boats. A double hood (above and below the navigational light) was then introduced and this is evidenced from at least U 164 onwards. U 509 was different from others in that this IXC had a wind deflector which continued into the periscopic rod aerial fairing on the port side. On the starboard side U 509 was also different in having a longer wind deflector than what would be expected from such an early IXC. Another difference is the gap in the railing on the *Deutsche Werke* boats.



Above (14): As covered earlier, there was a difference in respect to the two grills lower down. On the IXAs, IXBs and the *Deutsche Werft* IXC U 505, there were eight horizontal bars arranged with equal distance between the bars and no gap at the bottom. From U 506 onwards, the number of bars was the same but a significant gap appeared beneath the lowest bar.

Outside details of tower

Hatch on port side - From U 103 onwards (U 103 to U 111 plus all IXCs and IXDs) there was a different style of hatch near the front of the port side. As seen in the tower profiles, this had a square and cross marker added to the door plus two drainage squares behind. The IXAs and early IXBs (U 64, U 65, U 122, U 123 and U 124) had only a simple hatch in this area and the newer style was not retrofitted to these older boats. The squares were not present on late war boats due to a fairing being added in this area.

Two lines below small hatch - Just below the spray deflector on both sides of many IXs, there was a smaller hatch with a hole. From U 122 onwards two long vertical lines were added below this hatch. From this information we can surmise that all IXAs and the IXBs U 64 and U 65 did not have this feature. We may also suggest that all other IXBs (U122, U 123, U 124 and U 103 to U 111) plus all the IXCs and IXDs did have this feature. This feature can be seen on the tower profiles.

Front railing - On the *Deutsche Werke* boats (U 501 series) there was a break in the railing directly below the hatch with the two lines. Boats from the other yards did not have this break. As discussed in Part XIII, all boats with the Turm IV in the late war period had the railings all the way around the front of the lower half of the tower.

Rear railing - On the port side the railings were at the same level but on the starboard side the railing at the rear was higher than the front. This height difference was the case on all IXs but the length differed between boats. For all IXAs and early IXBs (U 64, U 65, U 122, U 123 and U 124) the rear railing was longer and went back to almost where the ladder began. On U 103 onwards there was a shorter railing at the back.

Wind deflector

On IXAs the wind deflector flange was fitted all the way to the end of the top of the tower, including the lower side of the flange. The exception was the pre-war U 43 but this was changed to the long version in wartime. On IXBs, and early IXCs and IXDs, the flange was normally present only for three-quarters of the length and tapered to a point at the top. As shown below, the later IXs were full length and, with the exception of U 530 and U 841, tapered to a point at the top.

Evidence of wind deflector length in IX photographs			
Boats	**Long**	**Short (taper to a point)**	**Long (taper to a point)**
Wartime IXAs	Yes		
U 43 pre-war (IXA)		Yes	
All IXBs		Yes	
U 66, U 67, U 68, U 125, U 126, U 128, U 129, U 130, U 153, U 154, U 156, U 158, U 159, U 160, U 161, U 163, U 172, U 178, U 501, U 502, U 503, U 504, U 505, U 506, U 507		Yes	
U 166, U 167, U 168, U 174, U 175, U 176, U 180, U 185, U 187, U 188, U 196, U 199, U 509, U 513, U 523, U 530, U 534, U 546, U 550, U 843, U 856, U 858, U 870, U 873, U 889, U 1231, U 1234, U 1235			Yes
U 530 1945, U 841	Yes		

The first long deflector evidenced in photos by the author is U 509 launched in August 1941 shortly followed by U 175 launched at the start of September 1941. The last short deflector is evidenced on U 178 launched in late October 1941. This suggests that the process of change would be in autumn 1941, usually between September and October 1941. This feature was not retrofitted to older boats.

Navigation lights

The IXAs, IXBs and early IXCs had navigational lights on either side of the tower without any hood above or below. The addition of a single hood above the navigational lights appears to be an intermediate style introduced on only a very few boats including U 159 and U 160. A double hood (above and below the navigational light) was introduced at some point and can be seen in the table below.

Evidence of navigation light style on Type IXs			
Boats	**None**	**Single**	**Double**
IXAs and IXBs	X		
U 66, U 67, U 68, U 125, U 128, U 129, U 130, U 153, U 154, U 156, U 163, U 501, U 502, U 503, U 504, U 505, U 506, U 507, U 508, U 509, U 510	X		
U 159, U 160		X	
U 164, U 166, U 167, U 172, U 175, U 176, U 178, U 180, U 181, U 183, U 188, U 190, U 513, U 515, U 516, U 523, U 527, U 534, U 805, U 841, U 843, U 858, U 861, U 862, U 870, U 873, U 875, U 889			X

This feature is arguably best analysed not by implementation date but changeover on individual boats for each of three shipyards. The following table is an educated guess based on the table above, with U 157, U 158, U 171, U 511 and U 512 being unknown.

Expected navigation light style on Type IXs by shipyard					
Boats	**None**	**Unknown - none or single?**	**Single**	**Unknown - single or double?**	**Double**
A G Weser, Bremen					
IXAs and IXBs	X				
U 66 - U 68, U 125 - U 131, U 153 - U 156	X				
U 157, U 158		X			
U 159, U 160			X		
U 171				X	
U 172 - U 181, U 183 - U 200, U 841 - U 881, U 883, U 889					X
Seebeckwerft, Bremerhaven					
U 161 - U 163	X				
U 164 - U 170, U 801 - U 806					X
Deutsche Werft, Hamburg					
U 501 - U 510	X				
U 511, U 512		?	?	?	
U 513 - U 550, U 1222 - U 1235					X

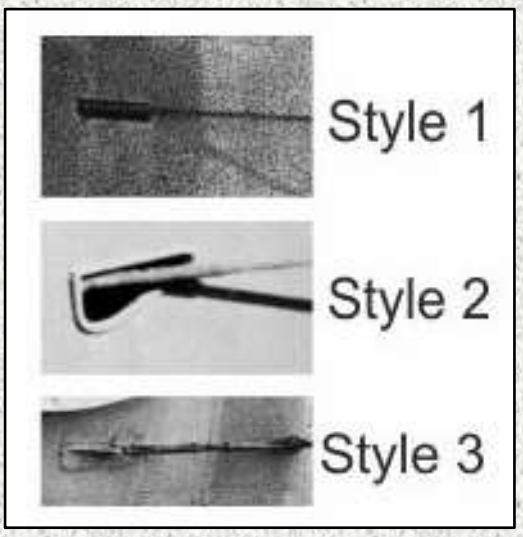
Jumping wire attachment points

The jumping wire attachment points on Type IXs varied between the early boats. On the first style (numbered 1 by the author) the wire entered the inside of the tower through a rectangular slit, with no lip around the edge. Style 2 was similar but there was a triangular shape instead of a narrow rectangle and an obvious lip around the edge. The reason for style 2 may be that it allowed crewmen or shipyard personnel to detach or attach the wire by allowing their fingers to gain access through the gap. This change was apparently deemed insufficient, requiring a further and simpler attachment point as per style 3. This final style included a turnbuckle on the outside which allowed easy manipulation of the tensioning of the cable and allowed the wire to be easily detached or attached. It is this final style (style 3) which features on the Revell kits.

Evidenced Type IX jumping wire attachment points					
Style 1 port	**Style 1 starboard**	**Style 2 port**	**Style 2 starboard**	**Style 3 port**	**Style 3 starboard**
U 37, U 38, U 40, U 43, U 44, U 103, U 122, U 123, U 124	U 37, U 38, U 40, U 43, U 44, U 103, U 122, U 123, U 124	U 104, U 106, U 107	U 105, U 106, U 107, U 108, U 110	U 108, U 109, All IXCs	U 105, U 108, all IXCs

U 105 - U 105 had style 2 but also at a later point had style 3. Of possible relevance is that U 105 also had the air intake grill on the top of the tower sides removed. It may be that when U 105 had the change to the latest style of air intake grill (horizontal preferred to vertical), the opportunity was taken to change the jumping wire attachment point to the latest standard, which would be style 3 at that point.

U 108 - Style 2 featured on the starboard side before the boat had an emblem (start of career) and when the boat sported a coat of arms and polar bear. Style 3 featured on the port side of U 108 when the boat had only the coat of arms and also when the boat had both the coat of arms and the polar bear. It could be that U 108 had style 2 on the starboard side and style 3 on the port side at the same time.



Above (15a-15c): The three different types of attachment points on Type IXs.

The following table is the suggested arrangements of the jumping wire attachment points on Type IXs -

Suggested Type IX jumping wire attachment points	
Style	**Boats**
Style 1	All IXAs (U 37 to U 44) U 64, U 65, U 122, U 123, U 124, U 103, possibly U 104
Style 2	possibly U 104, U 105, U 106, U 107, U 108, U 110
Style 3	U 105 at a later point, U 108, U 109 All IXCs

Given that we see a mix on U 105 and U 108, it is quite plausible that the attachment points were changed on other boats.

When the Turm II was fitted, the rear jumping wires were normally fixed to the railings rather than the attachment points on the sides of the tower. In this circumstance the attachment point would normally be left in place though there would be no wire attached.

Windscreen

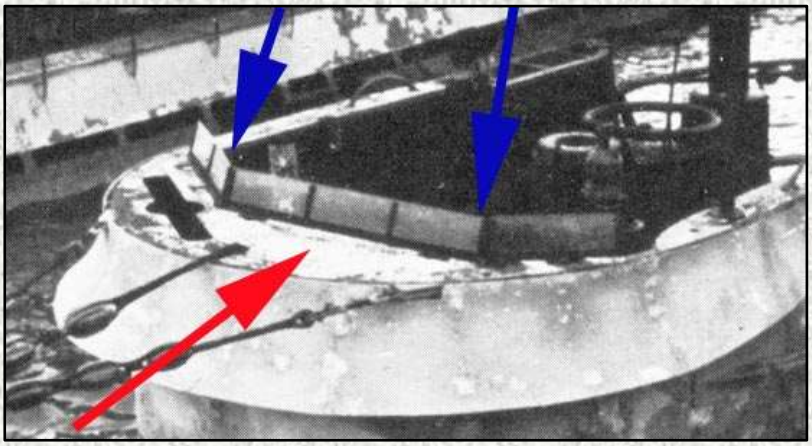
One feature which is not generally discussed in U-boat literature is the windscreen sections which were present on Type IXs (and, to a lesser extent, VIICs) and were introduced early in the war. This feature consisted of a number of clear screens which fitted into metal frames. The frames could be added to, or removed from, the metal base plate which was purposefully added to allow the windscreens to be in place (see red arrow in photo 17). There were hinges on this base plate to allow the frames with their screens to be positioned in the near upright position (sitting backwards at a slight angle) or to be removed and stored elsewhere.

It might be said that provision of this feature was not universal. Some boats had this feature at some points in time, though not necessarily over their whole career. The feature could even vary on the same boat, for example U 107 had an unusual full frame on one occasion and the more usual partial frame at other points.

Evidence of windscreen in Type IX photos		
Time period	**No**	**Yes**
Pre-war	All IXAs	
Apr 40	U 64	
Oct 40		U 37*
Nov 40	U 123	
Dec 40		U 103
Feb 41	U 103	
Mar 41	U 110, U 124	
Apr 41	U 123	U 110
Jun 41		U 123
Jul 41	U 126	U 108**
Sep 41	U 38	
Dec 41		U 107
Apr 42	U 129	U 154*
Jun 42	U 126	U 66*
Dec 42		U 160
Unknown time	U 65, U 66, U 106, U 130, U 156, U 162, U 167	U 38, U 39, U 43*, U 65*, U 103*, U 106, U 109, U 131, U 172*, U 868
*Denotes where the base plate is shown but not the windscreen **Alternative curved base plate		

In the above table, when the base plate was present it is assumed the windscreen was able to be put in place. It can be seen that U 123 did not have the windscreen or base plate in November 1940 but did have this feature by July 1941. U 110 did not have this feature in March 1941 but did in April 1941. Clearly the base plate and windscreen was fitted to U 110 in late March or early April 1941.

Right (16): This photo of U 129 in April 1942 shows what the front of the tower looked like when no windscreen base plate was present.



Above (17): The windscreen can clearly be seen on U 160 in December 1942. The red arrow points to the windscreen base plate while the two blue arrows point to the angle between the three sections. We can see that on U 160 the screens were present in three directions: a double screen at the starboard side, a triple screen in the middle and a single screen on the port side.

The style of the windscreens varied depending on the shape of the base plate. Some screens were longer than others, while others employed more clear sections than others. It would appear these were effectively hand made with no standardisation between all boats. As can be seen from photo 17, U 160 had a base plate which had a single screen on the port side, a triple screen in the middle, and a double screen at the starboard side. The IXBs tended to only have single screens. In the middle there was typically a double-length screen on the left and a single-length screen on the right; this was in addition to a single-length screen on the port side. Sometimes a single screen was fitted to the starboard side while on other occasions it was missing. U 108 was completely different in that this boat had a curved base plate which differed from the typical base plate arrangement. In some cases the frame did not extend to the top whereas on boats such as U 160 the frame was full height. The IXC U 509 was different from other boats in having a triangular shape at the forward port corner of the tower, with a lip which ran around the edge.

The presence of the windscreen could also be seen on some VIICs such as U 600, which had only two clear screens to reflect the narrower width of the conning tower on VIICs.

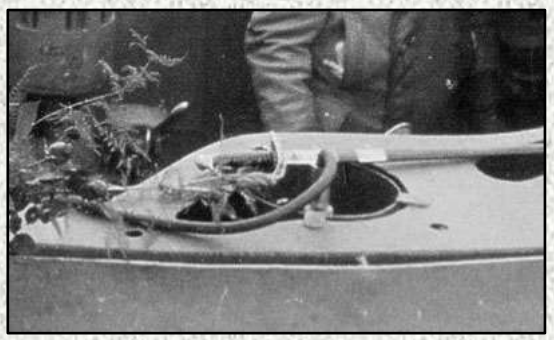
Alternative wind deflector shield

As an alternative to the clear windscreen, a few boats including U 68, U 128 and U 502 had metal sections added permanently in place around the rear of the base plate. These did not appear to be removable and had triangular support plates ahead of the sections. Removable clear screens could have fitted into these sections but this is speculative and there is no evidence of this being in place in period photographs. Instead this feature appears to be simply an additional wind / wave deflector shield that crewmen could hide under. The height was low meaning that any benefit would be marginal. U 172 also had a flange but this was a very narrow height.

Left (18): The additional wind deflector shield on U 68 in April 1942.

Mystery object

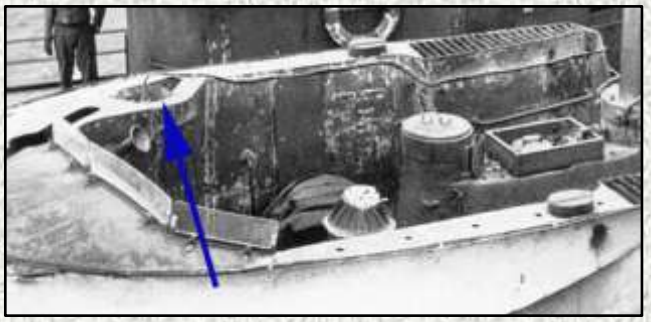
On all VIIAs, early VIIBs (U 45 to U 55, U 99 to U 102) and the very early VIICs (U 93 to U 98) there was a mystery object. Attached to a rubber hose, it was positioned within a vertical tube just ahead of the sky periscope base. The purpose of this object has not been confirmed by it is suggested that it could be the housing for a weather balloon bottle and filler hose. On the early IXs there was a similar object positioned to the starboard side of the tower, directly behind the D/F loop. As can be seen from photo 19, a thick cable attached to the object which was positioned at the top of a vertical tube. Just to the rear and side was an extra area, though the purpose of this is unclear. What we can be certain of is that the cable ran backwards near the top of the starboard bulwark and terminated somewhere at the rear of the bulwark.



Above (19): Although partially obscured by flowers added to the tower at the conclusion of a patrol, we can see part of the mystery object on U 123. The cable is secured into the top of an object which is itself fixed into the middle of the vertical tube.

Below (20): Another image of U 123 showing the position of the object and the cable running backwards near the top of the starboard bulwark. Note also the three areas of clear screen for the windscreen without metal frames.

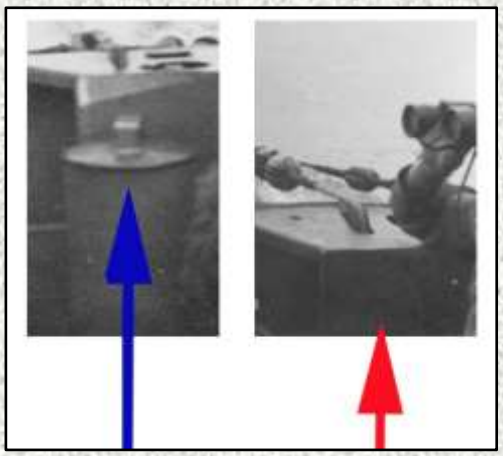
The cut-off point where this feature was not seen on Type VIIs (when this feature was deleted) was in the late summer 1940 period, with it being last evidenced on boats launched in August 1940. The feature was present on all IXAs plus the early IXBs (U 64, U 65, U 122, U 123, U 124 and U 103 to U 107). It was not present on U 108 to U 111, nor on any IXCs or IXDs. U 107 and U 108 were launched in July 1940 so this would be the changeover date for IXs being launched.



The July 1940 deletion date on IXs roughly correlates with the August 1940 deletion date on VIIs. Given the fact they looked similar visually and were removed in the same time

period, it would appear that they served the same purpose on both types of U-boat. Due to the multitude of differences between U-boats in regard to other features, it is not surprising to find differences in this feature. This included, but may not necessarily be limited to, the following: U 40, U 43, U 65 and U 103 had only a circle at the top; U 123 and U 124 was round with an elongated shape; U 107 had a unique shape to the side and rear; and U 37 had a cover on the top with a dome. Clearly there was no standardised design despite the boats being built by the same shipyard in Bremen.

Third periscope



Above (21a-21b): On the left is the IXA U 38, with the blue arrow pointing towards a lid on top of the third periscope. On the right is the same area of the IXB U 103.

One topic that has been discussed by modellers building the early war Revell IXC kit (05166) is the third periscope. The Type VIIs had two periscopes: one larger sky periscope at the front and one smaller attack periscope at the rear of the tower. These periscopes extended out of two separate housings with a large space in between. On the Type IXCs there were also two periscopes - with the larger sky periscope again being ahead of the attack periscope - but both periscopes were located in one single housing. This obvious difference between the types allows us to clearly and easily distinguish between types when we have a photo of the inside of the tower.

Online sources state that a third periscope was deleted on IXCs, suggesting that IXAs and IXBs did possess a third periscope. The sources do not tell us where the third periscope on the earlier sub-variants was located. This extra periscope is not visible in the extended position in photos and it is hard to discern this feature even when many pre-war and early war photos are available. However, photos 21a and 22 shows that it was located within a vertical tube just behind the position where the front jumping wire entered the boat. The position is not unexpected given that this is the very same location where the sky periscope appears on the Type VIIs and on the Type XB U 117. Both photos show that the top of the vertical periscope tube did not reach up to the same level as the top of the tower.

Hang on, you say, is that not the same position where the windscreen baseplate was located? Clearly it would be problematic if the baseplate precluded the raising of the third periscope. Rather than deleting this third periscope, a sensible solution was found in that a hole of suitable diameter was cut into the baseplate to allow the third periscope to extend upwards through the baseplate. A periscope lid can be seen on the IXA U 43 in photo 23 as well as a few other photos of IXAs and IXBs with the windscreen baseplate. Crucially, the round hole (or lid) is positioned in exactly the location we would expect the third periscope to be. Although the author has not seen a periscope extended upwards through such a hole in the windscreen baseplate, it is suggested that enough evidence has been presented to confirm the location of a third periscope on IXAs and at least some IXBs. No evidence of a third periscope can be seen on any image of an IXC or IXD, either in the form of a vertical support tube or a circular hole on a windscreen baseplate.

Photo 21b shows, in part, this area on the IXB U 103 and does raise a potential problem. We might expect to see a periscope lid at the bottom of this photo despite this area being shrouded in darkness. It is true that periscope lids were not always in place, as evidenced by photo 22. From research into German U-boats, we do know that some features were brought in regardless of the sub-variant involved. For example, the late VIIB U 99 had the later attack periscope housing which was similar to VIICs but distinctly different to earlier VIIBs such as U 48. Many other features in this article are not sub-variant specific and were introduced as required. If the German designers

had deemed the third periscope unnecessary they may not have waited for a new sub-variant - the IXC - to implement this change.

We know that all the IXAs and the first five IXBs (U 64, U 65, U 122, U 123 and U 124) had the third periscope. It is also clear that all IXCs did not have the third periscope. As for the presence of absence of the third periscope on the later IXBs (U 103 to U 111), this present study has proved inconclusive. It looks very much like there was no circle in the windscreen baseplates on U 103 to U 111 but the author remains cautious on this matter, suggesting that the level of proof required to propose the third periscope was not there on these late IXBs has not been met. Therefore it may be that the third periscope was present on U 103 to U 111 as per conventional wisdom.

Left (22): An early photo of U 124 before the windscreen baseplate was added. The green arrow points to the position of the vertical tube housing the third periscope. Note the foldable step at side of the periscope housing and the extended periscope at the rear having no anti-vibration wires; these features point to an early time period after being commissioned in June 1940.

Below (23): The red arrow shows the lid of the circular cover which is present within the windscreen baseplate on the IXA U 43. The third periscope would extend upwards through the circular gap when this cover was removed. Incidentally, the raised parts at the rear of the baseplate allowed the windscreen frames to be held in place when they were intended to be utilised.

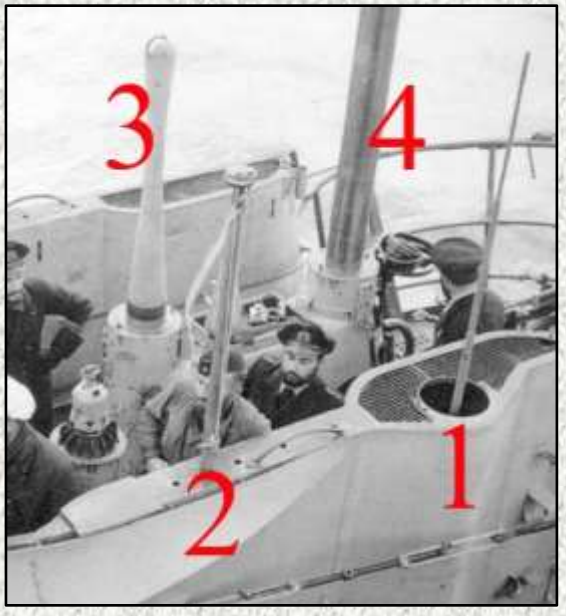
U 123 - It should also be pointed out that there is a caveat regarding U 123. As pointed out by Jean Marie Blanchet in his study for a future model of U 123, the top of the tower on this famous IXB was badly damaged in a collision in November 1940 and is likely to have resulted in the boat having only two periscopes in all subsequent patrols. The attack periscope was sheared off, the sky periscope was bent backwards and the front of the tower was badly crumpled. Given that a later photo showed a baseplate without a circular gap, which would have been required if there had been a third periscope at that time, it is expected that the third periscope at the front was not repaired and was removed when the front of the tower was rebuilt. The repair occurred in December 1940, at which time the latest standard was to have only two rather than three periscopes. It would not be worth the time and cost to add three new periscopes at that time when the norm at that time was for two periscopes.

Type IXDs - Further to this debate, there is a photo purported to be the IXD2 U 177 which shows what looks like a periscope with lid at the very front of the tower. We cannot assume that this object is a third periscope but it does have the lid that is entirely typical of the top of a periscope tube. It is also in the same position as the third periscope on IXAs and IXBs. According to conventional wisdom this third periscope should not be there. However, the scarcity of internal photos of Type IXDs mean that is it eminently possible that we could be unaware of a third periscope on some or all IXDs. It would be prudent not to draw any firm conclusions on the basis of this one photo, which may, after all, conceivably be an early IX misidentified as U 177.

Revell's "third periscope" debate

On Revell's early IXC kit (05166) there is a feature (part 133) on the top of the port bulwark which has caused debate and confusion. The object is a shaft which tapers to a point at the top. Several modellers have suggested this is a third periscope but became confused when finding sources which indicate that the third periscope was deleted on the IXC variant. In fact, this feature on Revell's early kit is not a third periscope at all. Rather it is the extendable rod aerial (also called periscopic rod aerial) that was introduced on U 108 and made standard from that boat onwards. Revell part 133 has the aerial on top of a shaft (which is the same diameter as a periscope shaft) but the top is clearly intended to taper to a point rather than depict a periscope head with optical view. It may be said that Revell's part 133 is actually correct in its intentions (it is meant to be an extendable rod aerial) but has been poorly executed in terms of how the part relates to an actual rod aerial, arguably due to the limitations of injection moulded plastic.

Modellers should be aware that in almost all cases the periscopic rod aerial was not shown in the extended position. The photo of U 155 (photo 25) which proves Revell's part 133 is correct in intention shows this in the extended position. However this is very rare and modellers should be very wary of extending it fully beyond the position shown on U 129 in photo 24.



Above: (24): U 129 in April 1942 shows various features discussed in this section: extendable rod aerial (1); commander's flagstaff (2); sky periscope head (3); attack periscope shaft (4). Note how the extendable rod aerial has various thicknesses which progressively reduce as we advance in height. The modeller would need to use three separate rods of different diameter which fit into each other. This would require careful sourcing of rod as there is very little difference in diameter in 1/72nd scale. Note also that the tower bulwark on the starboard side is presently devoid of wooden panelling.

Right (25): In this photo of U 155 in June 1942, the blue arrow points to the extendable rod aerial which is shown in the fully raised position. This feature is not to be confused with the commander's flagstaff which is directly in front, as is the case with the photo of U 129. Viewing the rod aerial shaft in the extendable position is very unusual, especially when victory pennant flags have been flown from this feature rather than from the sky periscope (front) or attack periscope (rear).

Periscope anti-vibration wires

The periscopes on U-boats originally had no wires around the top. At some stage early in the war, anti-vibration wires were added to the top of periscopes to help reduce the wake left by a raised periscope. The following table provides evidence as to when this feature was introduced to Type IXs.

Periscope wires on Type IXs				
Time period	**Sky - no**	**Attack - no**	**Sky - yes**	**Attack - yes**
1940	U 39	U 39, U 124	U 108	
Oct 40		U 37	U 38	
Jan 41		U 67		
Feb 41				U 103
Apr 41			U 110, U 123	U 110
May 41			U 66, U 128	U 66, U 128
Jun 41	U 67, U 105		U 106	
Aug 41			U 123	U 123
Sep 41		U 124		
Oct 41				U 129
Nov 41		U 124	U 124	
Dec 41		U 124	U 126, U 128	U 108, U 128
Feb 42				U 66, U 123
Mar 42			U 502	U 123, U 158
Apr 42	U 129	U 124		U 68, U 160
May 42				U 154
Jun 42				U 506
Jul 42			U 128, U 155	U 128, U 159
Aug 42		U 67	U 502	U 502
Sep 42				U 108
Oct 42			U 176, U 507	U 507
Nov 42			U 506	U 509
Dec 42		U 504	U 518	U 130, U 160, U 172
Feb 43			U 514	U 514
Mar 43			U 163	U 163
May 45	U 190			U 190
Unknown time	U 65	U 126	U 103, U 105, U 106, U 158, U 159	U 105, U 126, U 168, U 510

From the table above we can see that the transition began around the autumn of 1940. As we would expect from our studies of other U-boat features, it would not be instantaneously introduced throughout the fleet and there would be an implementation period of unspecified duration. It would appear that the wires would have been present on most boats by the early months of 1941 but there is simply not enough data to be more precise on the exact duration of the implementation period. Although the majority did have the wires by the early months of 1941, there are at least four exceptions in 1942 in the form of U 67, U 124, U 126 and U 504. The reasons for these exceptions are not evident. The very limited amount of steel required - merely a few wires - would not have been in short supply and the expenditure, in terms of finance, time and complexity, would be comparatively small in comparison to other changes introduced over time to U-boats. It may be that the improvement that resulted from the addition of the wires was moderate and certainly not critical when compared to the very necessary introduction of radar and radar warning later in the war.

Clearly there would not be a formal order preventing a boat going on patrol if not fitted with anti-vibration wires, as was the case in subsequent years in relation to anti-aircraft armament. This may, in part, explain why there were exceptions in regard to the implementation of this feature.

Wooden panelling

The purpose of the vertical wooden strips running around the inside of the tower bulwark in mid-to-late war U-boats was to help to prevent the clothing of the lookouts from sticking to the bulwark sides in icy conditions. The following table indicates when this feature was present or absent, with a clear delineation between the wider style and narrower style.

Evidence of wooden panelling in Type IX photos			
Time period	**No**	**Yes - wide**	**Yes - narrow**
Apr 41	U 66		
May 41	U 128		
Aug 41	U 123		
Sep 41	U 156		
Dec 41	U 67, U 126, U 172	U 128	
Mar 42		U 156	
Apr 42	U 129		
May 42			U 180
Spring 42			U 163
Jun 42		U 66, U 128	
Jul 42	U 126		
Aug 42		U 129, U 156	
Autumn 42	U 67		
Oct 42		U 507	
Nov 42		U 509	
Dec 42	U 68		
1943	U 123	U 523	
Unknown time		U 130, U 510	U 162, U 172

Implementation period - From the above table it can be seen that this feature was present on U 66 in June 1942 but not in April 1941, present on U 156 in March 1942 but not in September 1941, and present on U 128 in December 1941 but not in May 1941. Evidentially it was a feature not initially present on the early boats and retrofitted to the fleet. The order placed on the 24th July 1941 to line the bulwarks of U-boats with wooden strips provides us with valuable information. The fact that there is no evidence of the presence of panelling prior to December 1941 may conceivably be explained due to lack of photos available to the author rather than necessarily being due to the absence of the feature on U-boats. However, just because the order was placed in July 1941 does not necessarily mean that boats began to be being immediately fitted during the next refit after July 1941. It is suggested that retrofitting of the wooden panelling began around the autumn of 1941 but the implementation period was relatively lengthy. As with the discussion of the anti-vibration wires on attack periscopes, the wooden panelling was not a hugely important feature and could arguably have lengthened the implementation period to many months beyond the autumn of 1941. This hypothesis is supported by U 67 and U 68 still not having wooden panelling in late 1942.

Narrower panelling - Narrower wooden panelling was present on late war boats. U 505, an early IXC launched in May 1941, would have had wide panelling added after the order place in July 1941. In late 1942, when U 505 had the Turm II, there was narrower panelling in place. This is

further supported by a photo taken in Bermuda after capture in June 1944 which shows extensive narrow panelling around the inside of the tower bulwark. It is expected that U 505 was either outfitted with narrower panelling after the summer of 1941 or that extensive narrow panelling replaced more limited panelling (perhaps of the wider style) at some point.

Periscope base - On the 6th December 1941, a few months after the initial order an order was issued, a separate order was issued to add wooden strips to the periscope bases. This additional panelling can be seen on the main periscope housing on IXs on U 180 in May 1942, U 506 in November 1942, and on boats such as U 190 and U 889 at the end of the war. It is expected that this additional panelling was added progressively to the fleet from the order date.

UZO - Although the author is not aware of an order to add wooden panelling to the UZO, this may have been applied to some boats such as U 66. However this application is not universal as U 505 was not outfitted as such during capture in June 1944.

Front of tower - In May 1943 U 66 had panelling over all of vertical surface at the front of the tower. U 505 was photographed at Bermuda after capture in June 1944 with some of this area covered in narrow wooden panelling (with the central area devoid of panelling). The author does not have sufficient photographic evidence to form any conclusion as to the panelling in this area but it is suggested that it was added to at least some, or perhaps all, of the mid-to-late war boats at an unspecified mid-war period.

Tower bulwarks

Area on rear of starboard bulwark - There was a feature that was in place when all the IXAs and earliest IXBs (U 64, U 65, U 122, U 123 and U 124) were launched. On these boats there was an area at the top of the inside of the starboard bulwark consisting of a shelf and an object which bears some resemblance to an early version of the UZO. U 123 had this feature in May 1940 but it had been removed by September 1940, suggesting that its removal occurred in the summer of 1940. Originally these early boats had no air intake (style W) but this was replaced with air intake style X. It may be that the change to the style X air intake precipitated this change.

Above (26): The area on the inside of the starboard bulwark in a pre-war photo of the IXA U 40. Note how the top has a shelf with object.

Right (27): The inside of the port bulwark of U 108 in 1940 shows an absence of wooden panelling. There is a foldable metal seat on the bulwark and the side of the periscope housing. Note the anti-vibration wires on the attack periscope which suggest an early application to U 108.

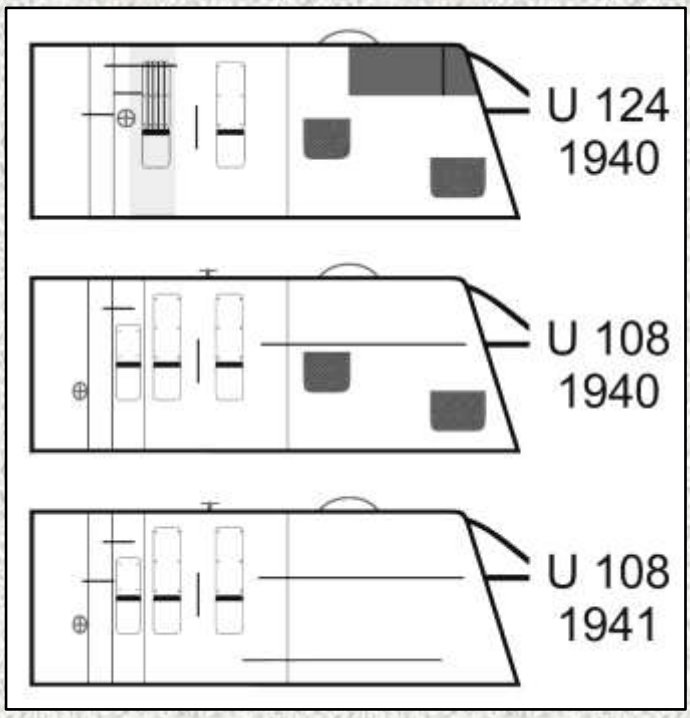
Foldable metal seats - The IXAs and the earliest IXBs (U 64, U 65, U 122, U 123 and U 124) had four foldable metal seats on the bulwark sides: two on the starboard bulwark and two on the port bulwark. The rearmost seat on each bulwark was lower and slightly longer. Each rectangular seat was normally in the vertical position and folded out to the horizontal position due to a hinge at the top. The top surface of each seat had a criss-cross pattern which might reduce the likelihood of a foot slipping. Each seat was thick and sturdy enough to support a crewman standing on the criss-cross surface when the seat was folded outwards. Despite their practical benefits these metal seats were all removed in 1940. The reasons for the removal may be that they were bulky and protruded several inches in from the tower bulwark, reducing ease of access for crewmen passing between the bulwark and periscope housing. Furthermore, despite the corners being rounded to reduce potential injury, a hapless crewman could easily bash their shin or knee against the thick steel seats in heavy seas. One assumes this error would be rather painful.

Above (28): This later shot of U 108 shows that the metal seats have been replaced by a ledge low down on the bulwarks and on each side of the periscope housing.

Ledges - When the metal seats were removed from the earliest IXs, they were replaced by narrow ledges added low down at the rear of the both bulwarks. These two rectangular metal ledges had rounded edges at the front and rear to reduce the likelihood of bruised shins when crewmen moved around the confines of the tower. The top surface had a criss-cross pattern intended presumably to make the surface less slippy. The width was relatively narrow but just wide enough for a crewman to climb upon. These ledges were permanently in place and added as standard on later IXBs and all IXCs and IXDs.

Panels and foldable wooden seats - There were two tall wooden panels on the starboard bulwark and, on some boats, another panel of shorter height below the direction finding loop. Another wooden panel of shorter height was in place on the port bulwark. Below each of the panels was another wooden panel which could be folded to form a seat or to be stood upon. This should not be confused with the thin vertical strips (wooden panelling) mentioned previously.

An exception occurred on the IXAs and early IXBs with the mystery object on



Below (29): The area at the top of the starboard bulwark of U 124 in 1940 can be seen in a dark colour, as can the two foldable metal seats; note how the rear metal seat was longer. The lighter shading is the semi-circular housing beneath the mystery object, which necessitated a panel with vertical strips that could cope with the curve. The grips on the bulwark sides and the curved bar on top of the bulwarks can be seen. The circle and cross was a marker at the front of the tower. Lastly it can be seen that the metal seats in 1940 were replaced by the ledge on U 108 by 1941.

the starboard side. The semi-circular housing beneath the mystery object could not take a flat wooden panel and required vertical panels which were capable of curving around. The rear panel remained the same in being a tall wooden panel.

Grips - The grip bars varied between boats, with a mix of vertical and horizontal bars of varying length and position. Generally there was a long horizontal bar on the rear half of the tower; this was positioned just above the midpoint on the starboard bulwark and another on the port bulwark. Once again we see variations, for example the bar was higher and shorter on U 160 compared to U 509.

Curved bar - Many IXs had a curved semi-circular bar on the top surface of both bulwarks. There were variations as we would expect. The bar was slightly shorter on IXBs and IXCs such as U 154, U 155, U 156, U 160 and U 164 than it was on others boats such as U 67, U 68, U 128 and U 509. The reason for this is unclear as it is not shipyard specific or related to date of launch. The curved bar was originally fitted to U 123 but was, for some reason, omitted early in the boat's career.

Top surface of bulwarks - There were some features added to the top of both bulwarks that were in no way standardised. These included, but are no way limited to, the following examples -

- Ahead of the curved bar on both sides of U 509 was a wooden rectangle with curved edges at the rear.
- In 1940 U 108 had a small round object on both sides.
- U 123 had a round object on the top of both bulwarks but no curved bar.

Removable machine guns

Four mountings on top of bulwarks - Machine guns mounted at the top of the tower bulwarks were typically a mid-war feature on U-boats. The weapons, which included MG15, MG34 or MG81 types, would be kept inside the boat when diving and brought out and mounted when they were to be used. Usually, but not universally, Type VIICs would feature two mounts and Type IXs would feature four mounts. But this was not the case on the VIIB U 48 which sported four machine guns when the famous U-boat was being displayed at Kiel at the end of her very successful operational career in June 1941. The first observed image by the author of a machine gun on an IX is on U 129 in October 1941. However, given the use of this feature on U 48 in June 1941, it is expected that the four mounts may have been added to a few IXs by mid-1941. Going only by photos of boats leaving or returning from patrol (which is indicative not necessarily representative of boats on operational patrol) this feature became more common at some stage in 1942. By late 1942 and 1943, machine guns were more commonly seen when leaving on patrol. For example, both U 510 and U 513 had all four in place when leaving Lorient on patrol in November 1942. The MG81s were affected by seawater and some commanders did not choose to mount them during an air attack. The MG15s were still used at sea.

Left (30): I know why there are two machine guns present but less sure why there is a giraffe in this photo. As far as I am aware, Lorient did not have a nearby zoo.

Central machine gun - In 1943 U 66, U 107, U 172 and U 508 had a gun mounted in the central position at the front of the tower. An attachment point was added to the rear of the semi-circular windscreen baseplate. It is expected that some other IXs were similarly outfitted.

Periscope base

Semi-circular cut out - One of the main errors in the Revell IX kits is that they lack the large semi-circular cut out at the bottom of either side of the periscope base. Along with the two ovals on the port side, two ovals on the starboard side and narrow oval at the front, these allowed water to drain out of the periscope base.

Above (31): The commissioning of U 103 in July 1940. The semi-circular drainage gap at the bottom of the periscope housing can clearly be seen along with a substantial rim at the edges. The C-shaped ring and two support bars below can be seen at the bottom of the rear end of the periscope housing.

Oval cut out at front - On the front of the periscope base was a narrow oval gap which would allow water to drain out the front. Running from the top to the bottom of the oval gap was a vertical grip bar, though the vertical bar was missing on the late war boat U 889. This feature is also missing from the Revell kits.

C-shaped step - Another feature missing from the Revell kits is the C-shaped step with two supports at the bottom of the rear end of the periscope base. This had two support bars below.

Compass repeaters - Initially there were two compass repeaters, one at the front of the tower on the port side, and another directly behind the top of the periscope housing. The rear repeater was removed from Type IXs around the autumn of 1942 and consequently was not a feature of mid-to-late war boats. Photos show this feature was absent from U 67 in August 1942, absent from U 156 at some point in 1942, and absent from U 68 and U 160 in December 1942. By contrast, U 509 still had the rear repeater in November 1942. There were exceptions in that the rear repeater was absent from U 37, U 38 and U 43 in 1940.

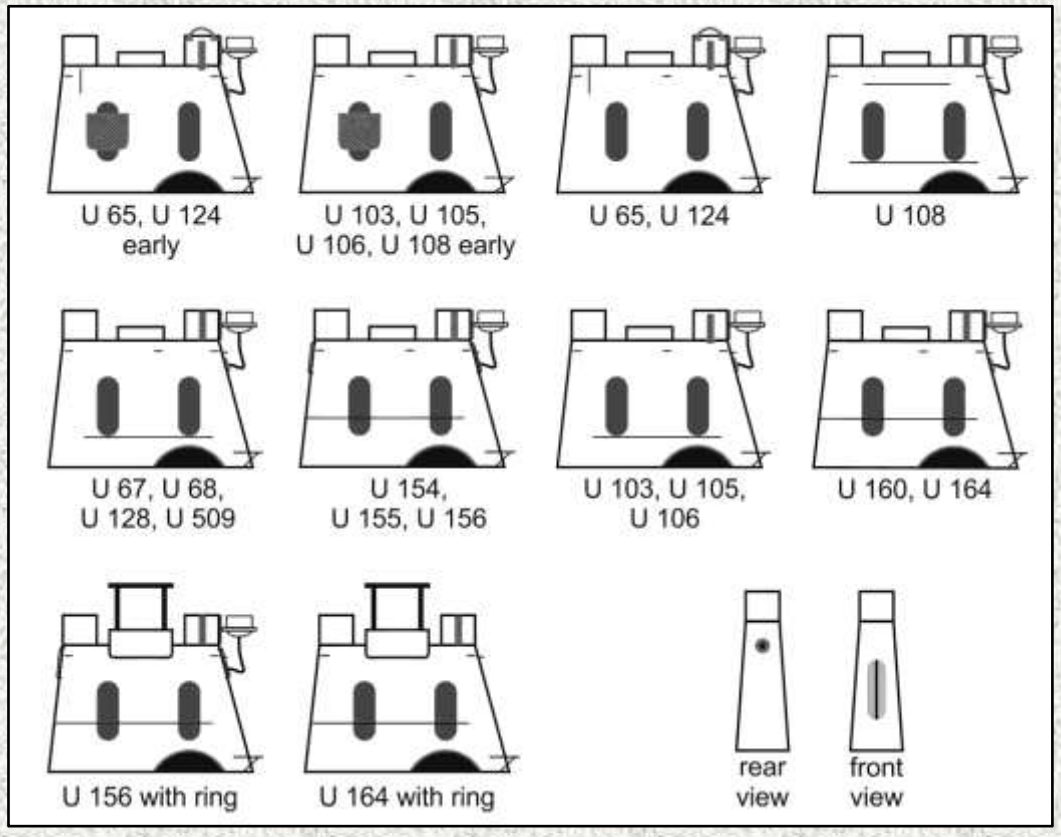
Foldable metal seats - The IXAs and the earliest IXBs (U 64, U 65, U 122, U 123 and U 124) had a foldable metal seat on either side of the periscope housing, directly over the drainage gap. These two seats were exactly the same type as could be found on the bulwark sides and were removed at the same time in 1940.

Ledges - When the metal seats were removed, a narrow ledge was added low down on either side of the periscope housing. These were exactly the same style as the ledges added to the bulwark sides. The length and position varied between boats, with the ledge on U 156 and U 160 being farther forward and curving around the front of the housing. It was also positioned higher up than on IXBs and other early IXCs.

Grips - Some boats had small grip bars near the top of the housing; these varied between boats, with some having no bars at all. On both sides of U 124 there was a vertical bar set back a few inches from the front of the housing. On both sides of U 156 there was a vertical bar on the corner of the front and the corner of the rear of the housing (a total of four bars). U 108 had one long horizontal bar in the central position on both sides of the housing.

Small loops - There were up to seven small loops near the top of the periscope base on IXs, though the number and position varied between boats. Their purpose was presumably for hooking on the safety harness to avoid crewmen being swept away in heavy seas. Some later U-boats did not have these loops, though the reason for their absence is unclear.

Semi-circular bar - A semi-circular bar was present at the very top of the rear periscope housing on all IXAs and the earliest IXBs (U 64, U 65, U 122, U 123 and U 124). It did not feature on U 103 or any subsequent boat.



Above (32): The periscope housing on a range of IXBs and early IXCs showing many of the features discussed in this section. The foldable metal seats, as seen on the two profiles at the top right, were on the IXAs and early IXBs. A lot of features are missing from the Revell kits such as the large semi-circular gap, grips, C-shaped step, small loops, vertical plate and oval gap at the front of the housing.

Vertical plate - There was a vertical plate on either side of the cylindrical area where the attack periscope would extend out from. A slight variation existed in regard to the position of this plate, with it being positioned lower down on early IXBs up to U 106. The plates were missing from some pre-war IXAs but were present on U 40.

Wooden panelling - As previously mentioned, wooden panelling was added to the periscope housing in the mid-to-late war period.

Central box - In the centre of the top of the periscope housing was a rectangular box several inches in height with no lid. This box was not present on late war boats such as U 889.

Extendable support ring - From the summer of 1942 an extendable support ring was added on top of the central box. This consisted of two vertical bars with a circular support ring on top. The ring was

the appropriate diameter to allow a crewman to sit on top, permitting him to search for enemy vessels from an advanced height. It would appear that the height could be adjusted, allowing the bars to retract into the central area and the circular ring to sit just above the periscope housing. This was a simple but effective feature to improve visibility over the surrounding seas. It was not implemented upon Type IIs or Type VIIs, almost certainly because there was no obvious place to add such a feature. The support ring was in place on U 505 in June 1944 but was not present on U 190 and U 889 at the end of the war, suggesting that it was discontinued late in the war. Alternatively it may be that the support ring and its rectangular baseplate were removable and fitted into holes in the central area.

Left (33): The support ring can be seen in the extended position on U 156 in August 1942. Other features are the ledges with criss-cross pattern, periscope lids, wooden panelling on the bulwark sides, early UZO and semi-circular grip bar ahead of the air intake grill.

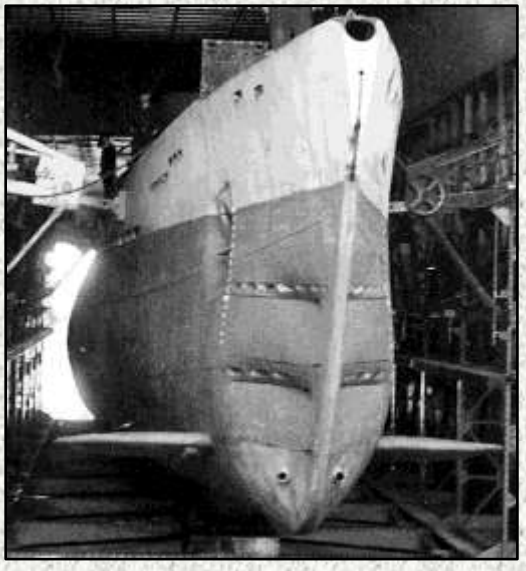
Part III - Early Hull Features

The following section will cover some of the features of the early-to-mid war Type IXs, with the hull features of late war boats being discussed in Part XIII.

S-Gerät

The S-Gerät (*Sonder-Gerät für aktive Schallortung* or "Special equipment for active sound location") active sound equipment was not available by the time the earliest VIICs were launched but was fitted on the stem in readiness for when the equipment became available. The order to install this feature on VIICs was placed on the 11th October 1940. It may be that the same circumstance holds true for the Type IXs. The very earliest IXCs may not have had the S-Gerät. Furthermore, it is assumed that this equipment was not retrofitted on IXAs and IXBs due to space limitations.

In time it was decided that the VIICs would not be fitted with the S-Gerät internal equipment after all, with an order to remove the equipment being placed on the 24th April 1942. It is expected that this removal also took place on the IXCs and was absent on U 517 in November 1942.

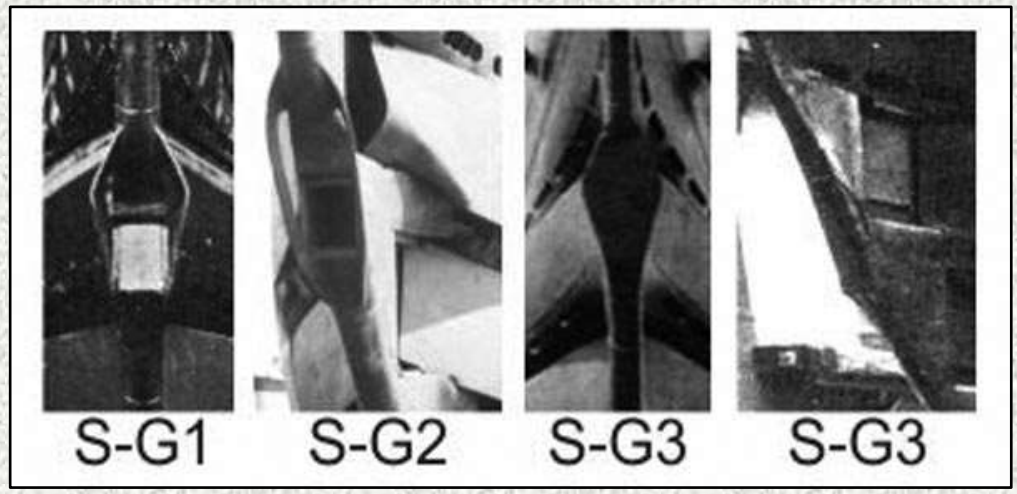


Above (34): The two vents near the top of this unidentified boat indicate to us that it is a Type IXC. Clearly there is no S-Gerät on the stem of what could be a later war boat.

There are several styles evidenced on the bow of IXs, with the style codes being ascribed by the author rather than being an official designation.

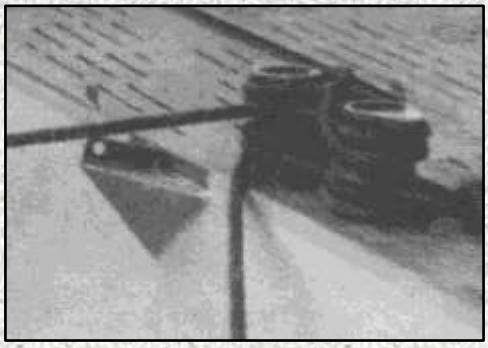
S-G1 - S-G1 is akin to the style found on the VIICs, with the two side bars separated by a space which could arguably have had the purpose of directing sound waves.

S-G2 - S-G2 is evidenced on a damaged U 128; it may be the case that the plate has been removed due to the damage to the bow. S-G2 also has curved side bars to direct the sound waves but is of a more elongated shape compared to S-G1.



Above (35a-35d): The three styles of S-Gerät on the stem of early to mid-war IXCs. There are two views of S-G3. The frontal view of S-G3 is U 158 and the side view is of U 194.

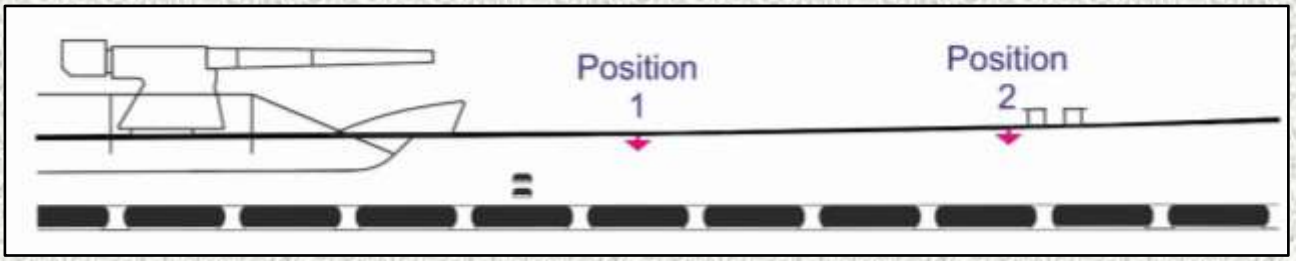
S-G3 - S-G3 does not employ the curved bars separated at the sides but does have a similar curved shape at the sides. The top half slants inwards and the bottom half (which presumably has the rectangular plate) is roughly vertical.



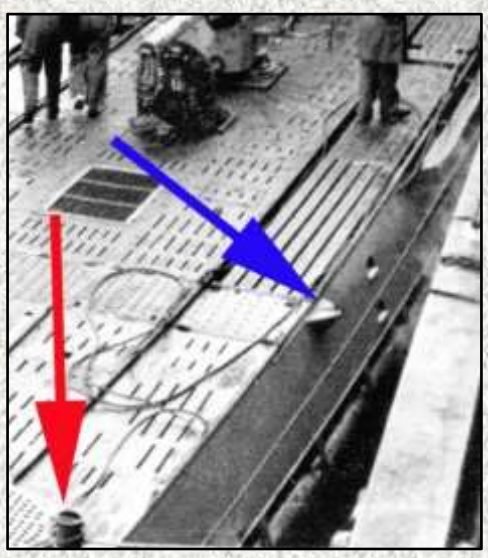
Hull fairleads

Some early IXBs and IXCs had a small fairlead sitting atop a support on either side of the hull casing. The position differed between two options, one just behind the deck bollards and the other farther aft. This feature consisted of a vertical plate through which a wire could be passed. The diameter of the hole was too thin to accommodate the main rope used to moor the boat to a pier. The hole must have been for a thin rope or wire, the purpose of which is unclear. It may arguably have been for a crewman working over the side to connect a harness onto. However, why a crewman would be required to do this at this position on the boat is not immediately apparent. Below the vertical plate is a support which looked rather like a half pyramid sitting on its side.

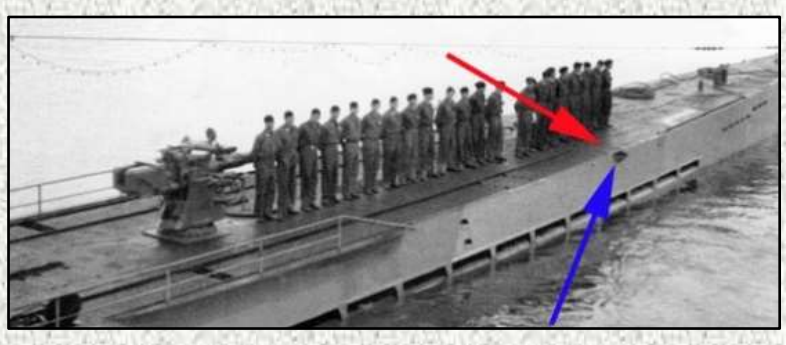
Above (36): A close up showing the details of the hull fairlead. This fairlead is in position 2 just behind the bollards. We can clearly see the hole in the vertical plate through which a wire or thin rope could be passed through. The diameter of the hole can be compared with the thickness of the rope wound around the bollards.



Above (38): Positions 1 and 2 are given in this drawing of the starboard side.



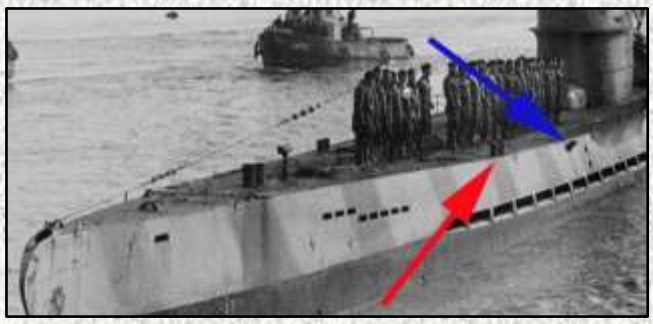
Above (39): U 108 on the 26th November 1942, with this feature in position 1. The blue arrow points to the fairlead and the red arrow points to the bollards. Clearly there is plenty of separation between the fairlead and bollards.



Above (40): U 106 in position 2, with the blue and red arrows showing very little separation between the fairlead and bollards.

Type IX hull fairleads			
Time period	**No**	**Yes - position 1**	**Yes - position 2**
Pre-war	U 37, U 38, U 43, U 44		
Jun 40	U 38		
1940	U 40		
Aug 40	U 65		
Dec 40	U 37		
Feb 41			U 106
May 41	U 128		
Jul 41	U 103		
1941		U 38, U 107, U 108	
Sep 41	U 107	U 68	
Nov 41			U 126
Dec 41		U 105	
Jan 42			U 67
Feb 42		U 123	
Mar 42		U 162	U 109
Apr 42			U 128
Jun 42	U 155, U 506		
Sep 42	U 155		U 510
Nov 42	U 509		U 108, U 152, U 505
Dec 42	U 534	U 43	
Apr 43			U 160
Jul 43		U 168	U 154, U 509
Sep 43			U 66, U 508
1943	U 515		
Jan 44			U 518
1945	U 532, U 889		
Unknown time	U 64, U 105, U 108, U 109, U 111, U 124, U 158, U 162, U 172, U 181, U 188, U 196, U 502, U 509, U 510, U 515, U 528, U 843, U 848, U 861	U 165	U 37, U 103, U 124, U 129, U 523

The table above indicates that there appears to be no pattern in regard to the position, with IXBs and IXCs adopting both positions. The earliest time it has been evidenced in photos is U 106 in February 1941. This suggests that from this point onwards the fairlead was added to some but not all existing boats. Although many *Deutsche Werft* boats (numbers in the U 501 series onwards) built in Hamburg tended not to have this feature, it was present on U 505 and U 523 so we cannot make any conclusions on the basis of shipyard.



Left (41): U 123 with the fairlead in position 1.

Forward access hatch position

Above (42): The access hatch is clearly offset to port ahead of the 105mm deck gun.

Type IXAs - One of the main ways to distinguish a Type IXA from later variants is to look for the position of the forward access hatch relative to the 105mm deck gun. Unlike the later sub-variants, the hatch on IXAs was behind the deck gun. The 105mm deck gun was positioned farther forward than on later sub-variants.

In centre - The majority of IXBs, IXCs and IXDs had this hatch in the centre of the deck just ahead of the 105mm deck gun. These included U 106, U 107, U 108, U 123, U 159, U 164, U 166, U 172, U 174, U 178, U 181, U 187, U 188, U 504, U 505, U 506, U 507, U 509, U 510, U 511, U 512, U 515, U 527, U 534, U 806 and U 1234.

Offset to port - Some IXBs, IXCs and IXDs had the hatch just ahead of the 105mm deck gun but slightly offset to port; these included U 66, U 67, U 68, U 103, U 124, U 126, U 128, U 129, U 154, U 155, U 156 and U 163.

Given that U 103 differed from U 106, and U 123 differed from U 124, there appears to be no pattern to explain why the hatch was offset on some boats.

Other features

U 159 had six metal strips on the forward deck. The reason is unclear and it is expected that other boats will have been similarly outfitted.

Part IV - Net Cutters

The net cutter is a readily identifiable feature that was sometimes present on the bows of U-boats in the pre-war and early war period. The removal of the net cutters was discussed in the article *Type VII U-Boat Modifications* and readers are directed to pages 80 and 81 *The Wolf Pack: A Collection Of U-Boat Modelling Articles* for the relevant information. To summarise, net cutters were present on Type VIIs until an order for their removal was placed on the 1st March 1941. Most of the net cutters were removed from Type VIIs in March and April 1941 but the removal process continued on some boats in May and June 1941. This information will inform or study of Type IX net cutter to see if there was correlation between U-boat types. We will discuss the upper net cutter above the deck first before dealing with the lower net cutter which was positioned on the stem.

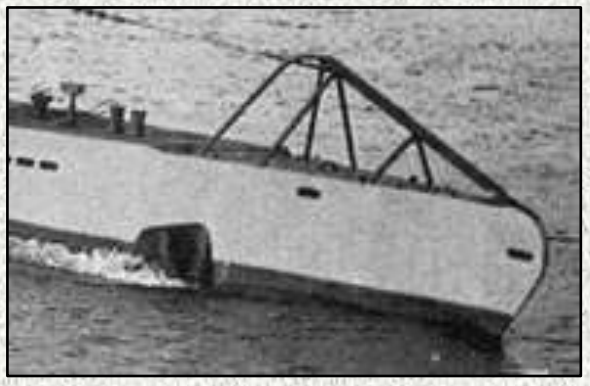
Upper net cutter

On Type IIs and VIIs the upper net cutter always had serrated edges. This issue is complicated slightly on Type IXs due to some being fitted with a straight rather than serrated edge.

There was also a rare feature on U 107 and U 108 in 1941 which kept the jumping wires slightly higher. On net cutters there were three inverted V support bars underneath the net cutter bar itself. On U 107 and U 108 it appears that only the farthest forward inverted V (Revell part 44) was retained, with the jumping wire joining at the top before meeting with the deck at the bow. U 108 had two further support bars ahead of the inverted V but U 107 did not.

Above left (43): The upper net cutter on this wartime shot of the Type IXA U 37 has ten serrated edges rather than the nine edges on Revell's early war IXC kit.

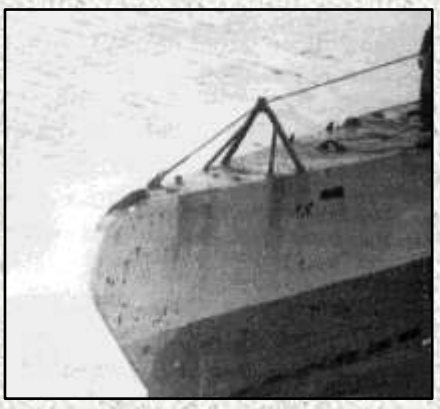
Above right (44): Another difficulty with Revell's kit is that the attachment point for the forward jumping wire was underneath the net cutter rather than at the top. This can be clearly seen in this image of U 124 in 1941.



Above left (45): The straight edge of the net cutter can be seen on the boat on the right, which is the IXA U 38.

Above right (46): The straight edge on the net cutter of the IXB U 107.

Right (47): The inverted V on the bow of U 108 (referred to in this article as Mini).



The following table examines the presence or absence of these features. The feature on U 107 and U 108 is referred to as “Mini”.

Type IX net cutters					
Time period	**No**	**Yes - straight or serrated**	**Yes - serrated**	**Yes - straight**	**Mini**
Pre-war	U 37, U 38		U 37, U 39		
Jan 39			U 41		
Dec 39			U 64		
Apr 40			U 64		
Jul 40			U 107	U 103	
Aug 40	U 65				
Sep 40					
Oct 40			U 37	U 103	
Late 40		U 123	U 65		
Feb 41	U 106	U 37		U 108	
Mar 41	U 67	U 107		Unidentified	
Apr 41		U 106			
May 41	U 110, U 123, U 128			U 107	
Jun 41		U 38, U 105		U 124	U 107
Summer 41	U 128				
1941				U 38, U 106	
Sep 41	U 68				
Oct 41	U 67				
Late 41	U 129				
Nov 41	U 124				
Dec 41	U 68, U 126	U 105			U 108
Jan 42	U 67, U 123				
Feb 42	U 106, U 123				
Mar 42	U 109, U 156, U 162				
May 42	U 123, U 129				
Jun 42	U 155, U 160, U 506				
Jul 42	U 156				
Summer 42	U 515				
Nov 42	U 512				
Sep 43	U 66				
Unknown time	U 109, U 111, U 130, U 154, U 158, U 161	U 128			

We can see from the table above that the upper net cutter featured on some boats in June 1941 but was, with the exception of U 105, absent thereafter. This correlates with the existing knowledge of the net cutter being removed after the order placed on the 1st March 1941. The above information therefore supports the hypothesis of net cutter removal in spring 1941 on Type IXs as well as VIIs. There are two outliers of boats without net cutters before March 1941: U 65 in August 1940 and U 106 in February 1941. These can be explained by either inaccurate captions or the net cutter removal being tested prior to official implementation. It should be noted that U 106 was fitted with a serrated net cutter in April 1941.

It is noted that U 37 and other IXAs did not have the net cutter at some point in the pre-war period but did have the serrated net cutter at another pre-war stage. This correlates with existing

knowledge of Type IIs and VIIs which had their net cutters removed in the pre-war period but had the feature reinstated prior to hostilities.

Lower net cutter

The lower net cutter will have been in place whenever there was an upper net cutter. The question of whether the lower net cutter would be present when the upper net cutter was removed is less clear. This will have been the case in the majority of cases. However, the IXB U 123 had a much smaller lower net cutter in August 1941, at which point the upper net cutter was absent. This small lower net cutter was retained until the end of hostilities on U 123. It may be the case that some other IXBs also had this smaller net cutter but the dearth of photographic material precludes positive confirmation of this theory.

As discussed in Part III, the S-Gerät featured on the stem of some early IXCs. Boats with the S-Gerät could not have a lower net cutter as they occupy the same position on the stem.

It is likely that Revell used plan 3 within *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle for their lower net cutter (part 71). Plan 3 has the flat edge beyond a serrated edge and the jumping wire attachment point meeting with a bar behind the net cutter. This differs from the lower net cutter on U 41 which has a simple flat edge.

Left (48): The large lower net cutter on the IXA U 41 in January 1939. Clearly this feature did not have a serrated edge which features in the early Revell kit.

Below (49): The second Type IXC - U 67 - on the 29th January 1941. Clearly evident are the hull breakwater on the starboard side of the hull casing and the deck breakwater ahead of the 105mm deck cannon.

Part V - Breakwaters

The breakwaters at the side of the hull on the Type VIIs were another feature in the early war period. To summarise the information on VIIs (from page 81 of the *The Wolf Pack: A Collection Of U-Boat Modelling Articles*), we know that the order to remove breakwaters from the hull sides of VIIs was issued on the 21st May 1941 but the actual implementation of the removal took place on most boats in the April/May/June 1941 period. We will again use the existing information about the VIIs and see if it is relevant to the IXs.

One difference with the Type IXs is that there were two separate types of breakwater which were intended to help prevent waves from crashing over the crewmen operating the 105mm deck gun. The first type - referred to herein as the hull breakwaters - consisted of a breakwater fitted on

either side of the top of the hull around the area of the 105mm gun (Revell parts 82 and 83). Although the shape differed from the version fitted to the VIIs, this first type fulfilled a similar function on the IXs by helping to prevent waves from crashing over from the sides of the hull. The second type - referred to as the deck breakwater - was the shield fitted across the deck directly ahead of the 105mm gun; this helped to reduce the water coming at the crewmen from ahead.

Analysis of period photographs shows that the presence or absence of the deck breakwater did not correlate with the hull breakwaters. Therefore the presence or absence of the deck breakwater did not mean that the hull breakwater would also be present or absent. As a consequence we may consider both features separately.

Hull breakwaters

Results of the analysis of period photographs of Type IXs shows the following in regard to the hull breakwaters -

Type IX hull breakwaters		
Time period	**No**	**Yes**
Pre-war	All IXAs	
Dec 39	U 64	
Apr 40	U 64	
May 40		U 122, U 123
Aug 40		U 65
Sep 40	U 37	U 123
Oct 40	U 37	U 103
Jan 41		U 67
Feb 41		U 37, U 106, U 107
Early 41		U 111
Mar 41		U 67
Apr 41		U 123
May 41		U 124, U 126, U 128
Jun 41		U 38, U 105, U 106
Summer 41		U 128
1941		U 108
Aug 41		U 103, U 123, U 124
Sep 41		U 68, U 107
Dec 41		U 68, U 126, U 129
Jan 42		U. 67, U 125
Feb 42	U 162	U 106, U 123, U 130
Mar 42	U 109	U 154, U 156
Apr 42	U 128	
May 42	U 123, U 154	
Jun 42	U 160	U 155
Jul 42	U 156	
Summer 42	U 515	
Aug 42	U 67, U 161	U 129
Sep 42	U 155, U 156	
Nov 42	U 505, U 506, U 509	U 108
Spring 43	U 103, U 106	
Unknown time	U 107, U 125, U 159, U 161, U 504, U 510	U 109, U 127, U 130, U 155, U 158, U 159, U 503, U 507, U 509

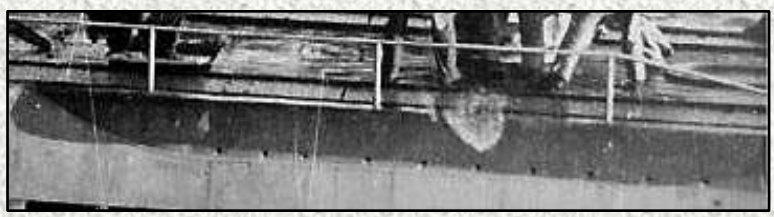
Implementation period - From the above table we may suggest that the hull breakwaters did not initially feature on the IXAs or on the very first IXB U 64. Furthermore it is evident that there is no correlation between Type VII breakwaters (removed in the April/May/June 1941 period) and Type IX hull breakwaters. The hull breakwaters would have been absent in the very early war period, with implementation around spring 1940 or so. It is expected that the IXB U 65 initially did not have the hull breakwaters just like her sister boat U 64.

Removal period - U 162 left on the 7th February 1942 without the hull breakwaters, with a removal time of late January or early February 1942 being suggested. It is also expected that they were removed from U 109 and U 123 in February 1942 and from U 155 in late June or early July 1942. U 129 left on patrol on the 20th May 1942 with breakwaters present and the patrol lasted until the 21st August 1942. Clearly there was no opportunity to remove them in the summer of 1942 because U 129 was on patrol in the Gulf of Mexico over this period. Presumably they were removed before U 129 departed on the next patrol in late September 1942. U 108 retained this feature at the end of a patrol in late November 1942, having departed on this same patrol in late October 1942. U 108 may constitute an outlier as many other boats had no hull breakwaters at this time. Overall we may conclude that Type IXs typically had the hull breakwaters removed in the first half of 1942.

Drainage holes - One feature that can be very difficult to spot are the small round drainage holes on the underside of the hull breakwaters. This feature is reminiscent of the VIIBs and VIICs, some of which had a curved line of holes in the area when the breakwaters were removed. But the drainage holes on IXs were different in that they were present on the underside of the breakwaters and also when the breakwaters were removed. Naturally there were different styles. The earliest boats such as U 108, U 123 and U 505 had ten holes, all of which were present in a horizontal line. Later boats such as U 159 and U 176 had 13 holes, with each hole at the end being higher than the rest due to the curve of the underside of the hull breakwater. Other boats are observed with 12 or 14 holes, again with one hole at each end being higher than the horizontal line of holes.

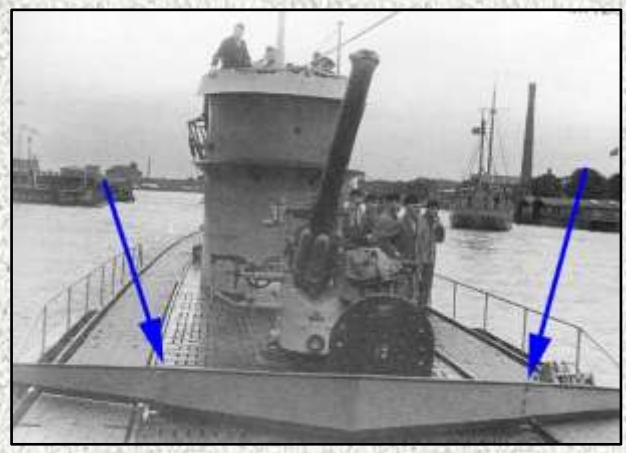
It is possible that these holes were not present on all boats with hull breakwaters. The holes cannot be seen below the breakwaters on U 106 at an unknown time, not on U 67 in January 1941, and not on U 126 and U 128 in May 1941. Nor can the drainage holes be seen on this area on U 509 in November 1942, by which time there were no hull breakwaters. The VIIBs and VIICs did not all receive the curved line of holes so there is a precedent for a lack of universal implementation. It could be that the holes are there but are difficult to discern. Modellers should be wary that these holes can be very difficult to spot due to their small size and can only be observed at short distance. If in any doubt, assume the holes were present on your chosen boat.

It is assumed that only boats which had been outfitted with the hull breakwaters would have these drainage holes. New boats launched from spring 1942 onwards would not have the hull breakwaters or these holes.



Above (50): The hull breakwater on an IXB showing ten small round drainage holes. The third hole is not equidistant between the second and fourth hole and is slightly elevated above the rest. U 123 did have the ten holes but they were all equidistant. These holes were normally retained when the hull breakwaters were removed.

Deck breakwater



Right (51): The IXB U 124 with a full-length deck breakwater in place. The blue arrows point to the bolts which allowed the sides to be removed.

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Results of the analysis of Type IX photos shows the following about the deck breakwater -

Type IX deck breakwater				
Time period	**No**	**Yes - full length**	**Yes - three quarters (not in starboard channel)**	**Yes - half (not in channels on either side)**
Pre-war	U 37, U 38			
Spring 40	U 64	U 122		
Jul 40		U 103		
Before Aug 40	U 37			
Sep 40		U 65, U 123		
Oct 40	U 37			
Jan 41	U 65	U 67		
Feb 41	U 108, U 123			
Early 41				U 108
Mar 41	U 37, U 38	U 67		
May 41	U 107, U 123, U 128	U 126		U 111, U 124
Jun 41	U 38, U 105, U 106, U 124			
1941		U 38, U 106	U 106	
Aug 41	U 123			
Sep 41	U 68, U 107			
Dec 41	U 126			
Jan 42	U 67			
Feb 42	U 123			
Mar 42	U 109, U 154, U 162			
Apr 42	U 103, U 123, U 128			
Jun 42	U 155, U 160			
Jul 42	U 156			
Summer 42	U 515			
Aug 42	U 129			
Sep 42	U 156, U 155			
Nov 42	U 108, U 152, U 509			
Spring 43	U 103, U 106			
Sep 43	U 66			
Unknown time	U 127, U 129, U 161, U 163, U 165, U 507	U 44, U 66, U 123, U 124	U 124	U 109

Left (52): Here we can see U 106 with the starboard side removed. It is not clear why only one side would be left in place.

From the table on the previous page, we can see that in 1940 and early 1941 plenty of IXs had the deck breakwater but the majority did not. There appears to be no difference in variant, with IXAs, IXBs and IXCs all featuring in different columns. Therefore both types of breakwater were not variant specific. Clearly there was no order requiring the presence or absence of this feature in this early war period. Modellers should refer to the individual boats in the table if they wish to fit this feature. If the modeller has no information on their chosen boats, it may be best not to fit this feature since the absence applies to the majority of boats.

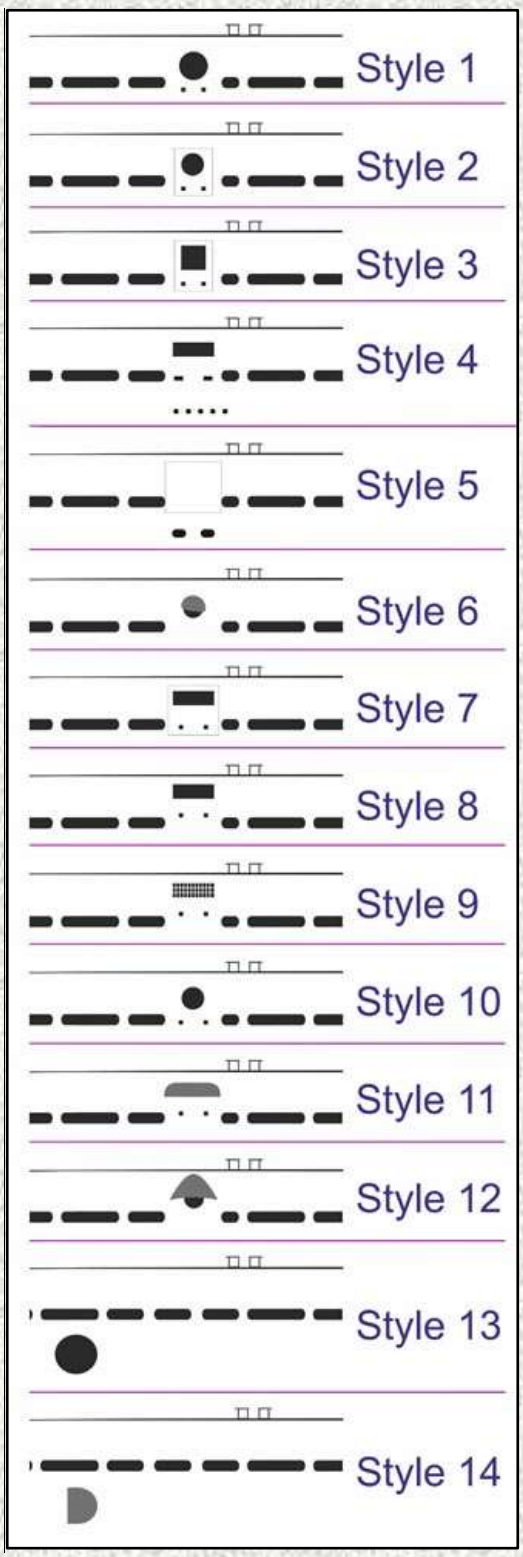
Where we might offer a suggestion is that the feature was last evidenced on U 124 in May 1941. On the VIIs the removal order was placed on the 21st May 1941, with the actual implementation of the removal around the April/May/June 1941 period. We might speculate that the removal order on VIIs was also formally applied to IXs or, at the very least, influenced the removal of IXs. Unless they have evidence to the contrary, modellers who are depicting their IX model in the summer of 1941 or thereafter should not fit a deck breakwater.

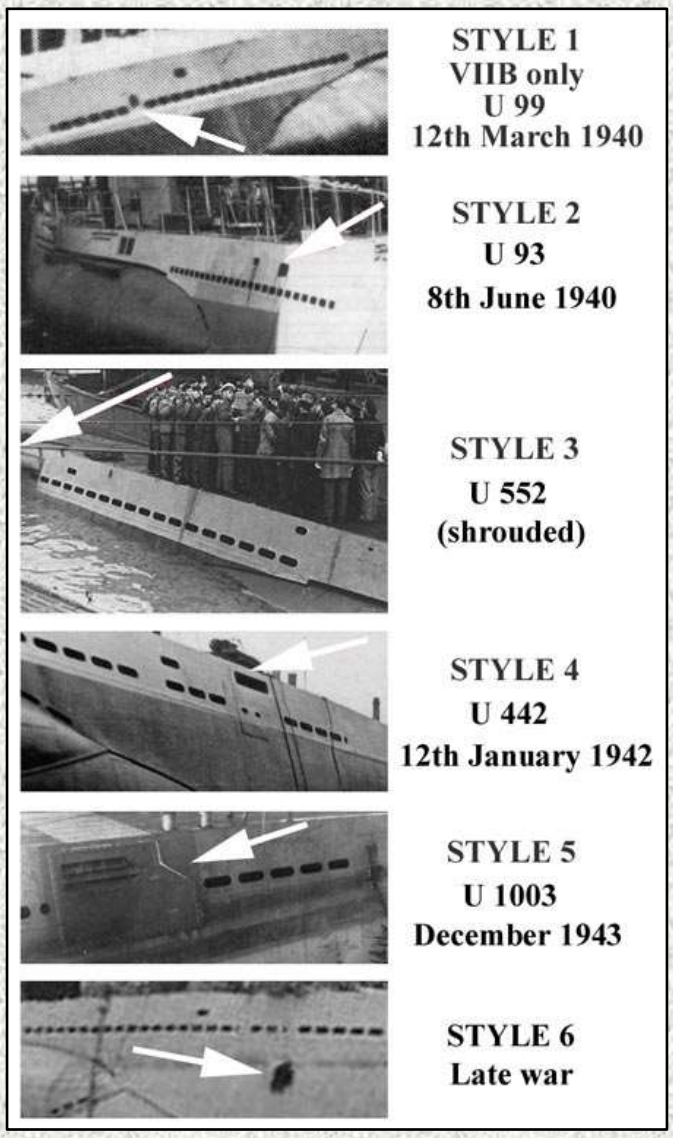
There are often exceptions with U-boats so it is not advised to form firm conclusions on this basis. For example, U 108 did not have the deck breakwater in February 1941 but did have the feature some point later in the first half of 1941. This feature was therefore fitted at some point after February 1941 but presumably removed in the spring or summer 1941. Naturally this information assumes that the dates and boat number were correct, which may not necessarily be the case.

Above (53): An unidentified Type IX with crewmen operating the 105mm deck gun. In this circumstance both the sides have been removed leaving only the central section in place.

Part VI - Exhaust Outlets

The diesel exhaust outlets were modified over time on both the VIIs and IXs. Information on the VII outlets is included here as some common features between the classes are evident.





Left (54): The various styles evidenced in photographs of Type IXs, with the right hand side being the front of the boat. For simplification, all styles here use a quarter vent ahead of the exhaust outlet rather than a half vent. As discussed in Part VII, this vent size differed between boats.

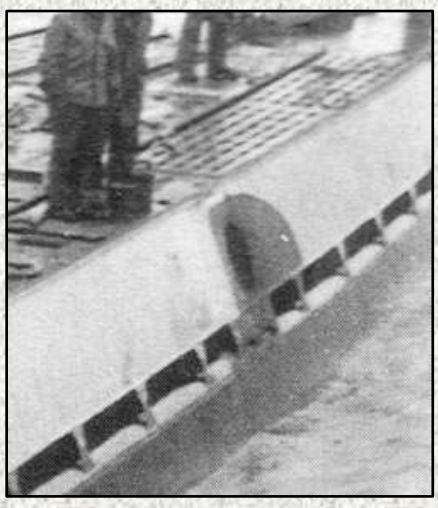
Above (55): The various styles evidenced in photographs of Type VIIs. The style numbers on VIIs are not intended to correlate with the style numbers on IXs and any similarities in the numbering are coincidental. There are clear similarities between the outlets on the two classes: the shroud on the VII style 3 is similar to the shroud on the IX style 6; VII style 4 is the same as IX styles 4, 7 and 8; and VII style 6 is similar to IX style 14.

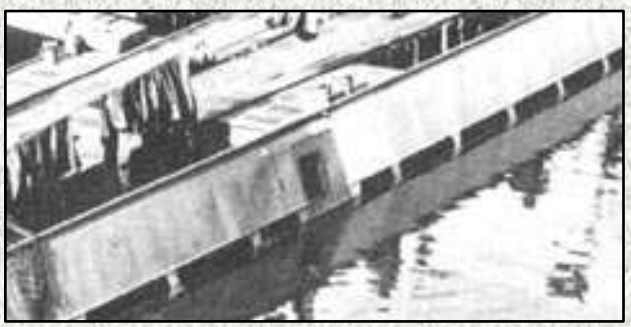
The IX styles included the following features -

- Style 1 - large round hole; small squares lower down (Type IXAs only)
- Style 2 - round hole; small squares lower down
- Style 3 - square, small squares lower down
- Style 4 - lower rectangle; small rectangles lower down; five holes below waterline
- Style 5 - no hole; plate over top; two ovals below waterline
- Style 6 - round hole; shroud on top, no small squares below
- Style 7 - lower rectangle; small squares lower down
- Style 8 - higher rectangle; small squares higher up
- Style 9 - higher rectangle with grill; small squares higher up
- Style 10 - round hole; small squares lower down
- Style 11 - higher rectangle; squares higher up; wide shroud on top
- Style 12 - round hole; shroud protrudes farther than style 6
- Style 13 - large round hole lower down hull; main vents in unbroken line
- Style 14 - large shroud pushing gases rearwards; main vents in unbroken line

Style 12 onwards can be considered as late war features. The two small squares low down on most styles are difficult to see due to their small size and location in period photos. Often they can be just below the waterline and are hidden in a photo of a Type IX not in dry dock.

Another issue which should be noted is that photos of IXs being launched often show the boat in an earlier stage of construction compared to Type VIIs. In some cases IXs being launched do not have the upper portion of the tower completed. The photo of U 125 being launched on the 10th December 1940 shows a rectangle but no squares below. It is assumed that U 125 would later have sported style 7 or 8 but that the squares low down had not been cut yet during the launch.





Above left (56): The area around outlet style 2 was painted black to disguise the exhaust staining around the hole. This practice was used in the early war period but discontinued at some point.

Above (57): U 65 in Brest in September 1940 with IX outlet style 3. The two small squares are hidden by the water at the waterline. Note how the vents directly ahead and directly behind the exhaust outlet were half vents.

Left (58): The shroud which is part of IX outlet style 6 can be seen on the IXB U 106. There may have been slight differences in the shape of the shroud between boats and there is no painting in black around outlet style 6.

Type IX exhaust outlets														
Time period	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Pre-war	U 37, U 38, U 42													
Dec 39		U 64												
Feb 40	U 37						U 68							
Apr 40		U 64												
Aug 40			U 65											
Aug 40 on			U 37											
Late 1940			U 108											
Dec 40		U 501	U 111											
Feb 41		U 124		U 503										
Apr 41							U 127							
Jun 41					U 123	U 38								
Jul 41			U 103			U 68								
1941						U 106								
Aug 41						U 123, U 124								
Dec 41								U 176						
Mar 42						U 109	U 154	U 182		U 502				
Jun 42						U 66, U 67, U 130								
Jul 42								U 187						
Aug 42											U 172			
Mid 42									?					
Nov 42						U 509		U 199, U 505, U 533, U 534						
May 43								U 200						
Jan 44								U 869						
1944						U 505		U 802				U 505		
1945								U 530, U 889				U 129, U 532	U 858	U 873
1946								U 123						
Unknown time		U 502	U 105, U 107			U 172, U 504	U 66, U 108, U 510, U 512							

The table above shows there was a wide variety of exhaust outlet style on Type IXs, with little commonality between batches or sub-variants. We can say that style 1 was only present on IXAs and can be discounted from any discussion of IXB and IXC models. The choice of whether to opt

for styles 2 and 3 in the early war period is not clear. It is suggested that modellers should look for their individual boat number if possible. Style 6 appears to have been implemented in the summer of 1941, with the shroud intended to concentrate the direction of smoky exhaust gases downwards. This style would be retrofitted to existing boats. It is noted that Revell's early war IXC kit (05166) features outlet style 6 with the shroud. The IXB U 123 would have had style 2 or 3 when launched, style 5 in June 1941, style 6 in autumn 1941 and style 8 at the end of the war. This is representative of exhaust outlets being upgraded to the latest standard over time to the IX fleet.

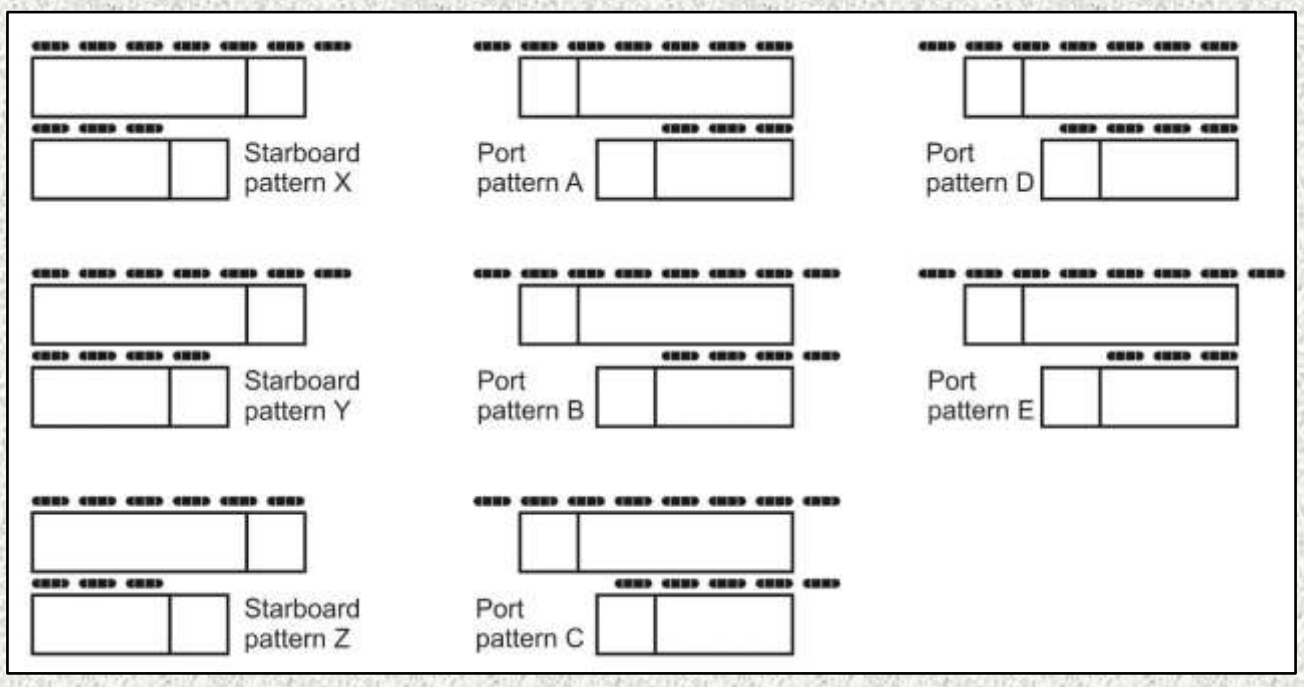
Late war - At the end of the war boats such as U 190, U 858, U 873 and U 1231 had an unbroken line of vents and no exhaust outlet visible above the waterline. When the outlet was moved below the waterline, the older outlets were removed and new vents were cut in this area. The problem with studying these boats is that the late war exhaust outlet was below the waterline where it is not visible unless the boat is in dry-dock.

Other boats such as U 530, U 532, U 802 and U 889 did not have an unbroken line of vents at the end of the war. The purpose of moving the exhaust outlet below the surface may have been to counter the Allied use of infra-red radiation.

Part VII - Vent Patterns

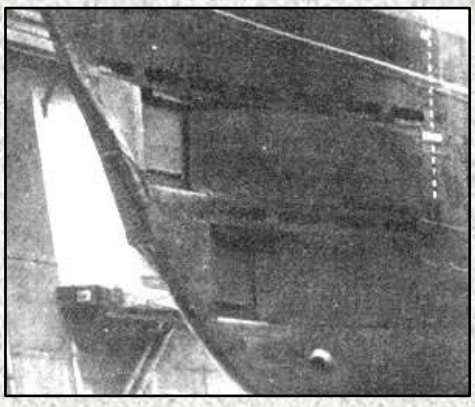
The vent patterns varied between various batches on the hulls of the Type IIs, VIIs and IXs, allowing batches to be distinguished from each other on the basis of the vent patterns. The patterns at the bow and on the hull casing of the Type IXs are discussed in this section.

Bow vents



Above (59): As with other articles, the letter attributed to the pattern has been devised and assigned by the author and is in no way official. Patterns A, B, C and D are not variant specific and do not relate to the IXA, IXB, IXC and IXD.

Type IX bow vent patterns - port side					
Time period	**Pattern A**	**Pattern B (Revell kits)**	**Pattern C**	**Pattern D**	**Pattern E**
Jul 40	U 107				
Oct 40	U 103				
Jun 41	U 158				
Summer 41	U 128				
Aug 41	U 123				
Oct 41	U 67				
May 42	U 129				
Jan 43				U 194	
1945				U 889	
Unknown time during war	U 108	U 510, U 523			
1950s		U 505			
Modern day			U 534		U 505



Left (60): Port pattern D on U 194 on the 7th January 1943.

Right (61): U 534 had starboard pattern Y.

Above (62): A somewhat damaged U 67 in October 1941. While some vents have been lost due to damage to the bow, this boat had port pattern A which was commonplace at the time.

Above right (63): The museum boat U 505, which presently has port pattern E, originally had port pattern B. Pattern E is unique, being formed due to years of corrosion in Chicago which resulted in one vent being covered over.

Port patterns - As can be seen from the first table on the previous page, port pattern A was commonplace on early war IXBs and IXCs. By contrast, the early war IXCs U 505 and U 510 - both built in *Deutsche Werft* in Hamburg - adopted port pattern B. This suggests that pattern B was specific to *Deutsche Werft* but more evidence is required to confirm this. Patterns C and D were adopted in the boats launched in the mid-war period.

Type IX bow vent patterns - starboard side			
Time period	**Pattern X**	**Pattern Y**	**Pattern Z (Revell kits)**
Pre-war	U 43		
Jan 39	U 41		
Oct 40	U 103		
Jun 41	U 158		
Summer 41	U 128		
Aug 41	U 123		
1945		U 889	
1950s	U 505		
Modern day		U 534	U 505

Starboard patterns - Pattern X was commonplace in the early IXs, with boats launched in the mid-war period adopting pattern Y. This is supported by starboard pattern Y being present in plan 4 (late war IXC/40) within *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle. Plan 3 (early war IXC) in this book has starboard pattern Z which appears to be erroneous for the majority, perhaps even all, of the early war IXCs. This plan does feature other errors so we cannot take details in plan 3 as factual.

U 505 - Port pattern E is not a wartime pattern and is unique to U 505. This boat originally had pattern B but repairs to the hull were necessary due to the corrosion from decades spent outside at Chicago. The repair job completed on the museum boat did not conform to the wartime version and unwittingly created unique pattern E by filling in one vent. The filling in of one vent also occurred on the starboard side, changing the wartime pattern X to pattern Z.

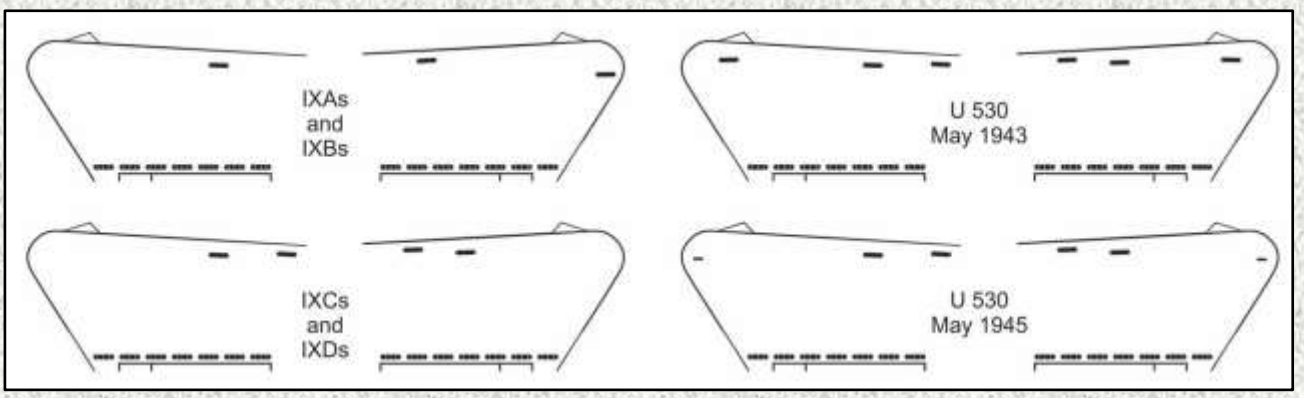
Revell patterns - All three of Revell's 1/72nd Type IX kits (05144, 05166 and 01533) feature the same bow patterns: port pattern B and starboard pattern Z. Port pattern B is correct for U 505 when captured in 1944 (and presumably other *Deutsche Werft* boats built in Hamburg) but is not correct for other early war IXs. As for the starboard side, pattern Z was not present on any IXs and should be changed to either pattern X or pattern Y.

Main hull vent patterns on IXAs, IXBs and IXCs

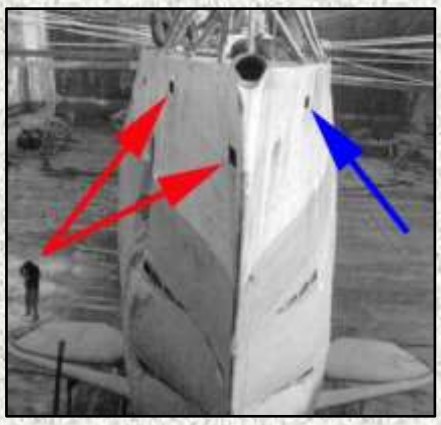
There is little difference in length and width between IXAs, IXBs, IXCs and IXC/40s and the central vents near the top of the hull had only minor differences between these sub-variants. Most modellers will be content to use the Revell kits as a basis for conversion to IXA or IXB. As for the IXDs, this sub-variant was much longer, making a conversion from a Revell kit a complex and involved task. Due to the extra length, the hull vent patterns on the IXDs were different from the earlier sub-variants and will be covered later in this section.

Bow vents - There is a characteristic feature at the bow which can help us distinguish the IXAs and IXBs from IXCs and IXDs. On the IXAs and IXBs there was one vent on either side plus one vent next to the stem on the starboard side. The IXCs and IXDs had two vents on either side and no vent near the stem. There are always exceptions with U-boats just to keep us on our toes and keep U-

boat research constantly intriguing. In 1943 U 530 had an extra vent on each side near the top of the bow. The reason for these extra vents on U 530 is completely unclear and unusual compared to the other boats in this class. More inexplicably these vents would shrink in the next two years, becoming very small vents by 1945. Although unusual, U 530 was not unique in that at least one other late war boat also had an extra bow vent at the front.



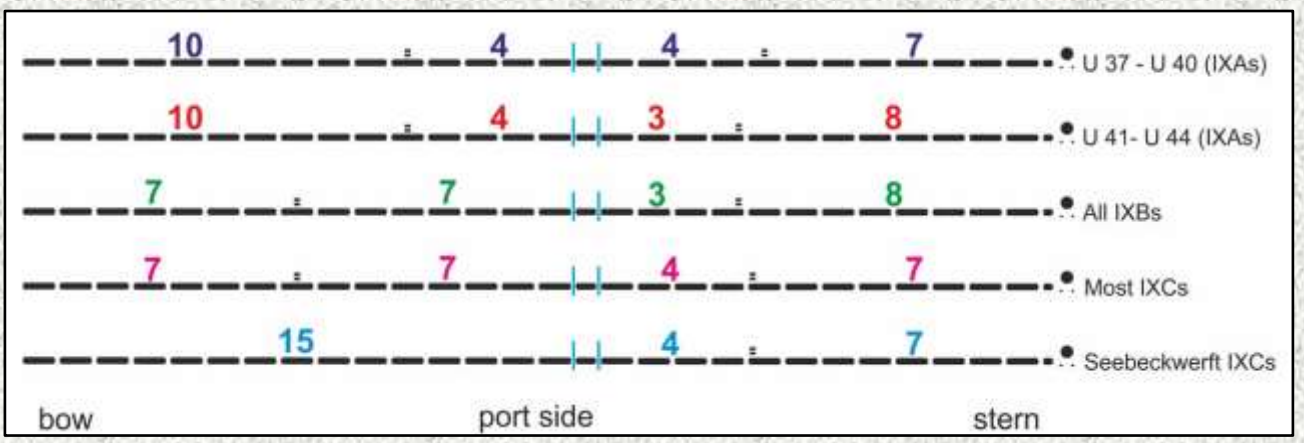
Above (64): A guide to the difference between the bow vents. Note the extra vent on the starboard side of all IXAs and IXBs.



Above (65): On the IXB U 103 the two vents on the starboard side can be compared to the single vent on the port side.

Below (66): The two vents clearly distinguish this boat as an IXC rather than an earlier sub-variant. The starboard side was the same as the port side.

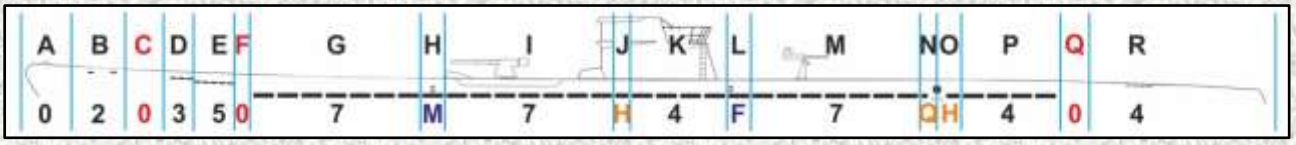
Footholes - As can be seen from the drawing below, the key difference is the position of the double footholes. The purpose was presumably for crewmen to put their foot in when moving to a small boat over the side. A modeller converting to an IXA or IXB needs to fill and drill these double footholes.



Above (67): The position of the two sets of double footholes on IXAs, IXBs and IXCs.

There were two sets of double footholes per side and they were in the same position on both port and starboard sides. All IXAs had the forward set in the same position, while on IXBs and IXCs they were three vents farther forward. On the early IXAs (U 37 to U 40) the rear set was above the middle of a vent. On later IXAs (U 41 to U 44) and all IXBs the rear set was above the rear end of one vent forward. On all IXCs the rear footholes were moved slightly farther back in the position above the front of the next vent. This shows clear progression, with U 41 to U 44 being essentially halfway between the earlier IXAs and the IXBs in regard to the foothole positions. There was a shipyard specific difference in respect to the forward set of footholes being absent from the IXCs built at the *Seebeckwerft* shipyard in Bremerhaven.

Main vents - Details of the vent patterns on IXCs can be found on page 26 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle. Their table will not be reproduced here and modellers are advised to refer directly to the original research completed by Köhl and Niestle. The author has used a slightly different system, with the codes shown in the drawings on this page. Some of the main vent patterns are given on the next page.



Above right (68): F, M and R (front, middle, rear) denote the position of the footholes above the main vents. Q, H and T are used to denote for quarter-length, half-length and three-quarter-length main vents.

Above (69): A guide to the author's classification system of vent patterns on IXAs, IXBs and IXCs. This differs slightly from the classification system used in Köhl and Niestle's essential guide.

Type IX main vent patterns - port side																		
Boats	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
U 37 - U 40 (IXAs)	0*	1	0	3	5	0	10	M	4	H	4	M	7	H	H	4	0	4
U 41 - U 44 (IXAs)	0*	1	0	3	5	0	10	M	4	H	3	M	8	H	H	4	0	4
All IXBs	0*	1	0	3	5	0	7	M	7	H	3	R	8	H	H	4	0	4
U 66, U 67, U 125, U 126, U 129, U 130, U 154, U 155, U 158, U 501, U 502, U 503, U 504, U 505 1941, U 512	0	2	0	3	5	0	7	M	7	H	4	F	7	H	H	4	0	4
U 515, U 515, U 518 1944	0	2	0	3	5	0	7	M	7	H	4	F	7	Q	H	4	0	4
U 510**	0	2	3	3,2	5,1	3	7	M	7	H	2, H,T	F	7	H	H	4	0	4
U 172	0	2	26				2	M	7	H	4	F	7	H	H	2	6	4
U 532	0	2	3	2	4	1	7	M	7	H	4	F	7	Q	H	4	0	4
U 188, U 190, U 194, U 534, U 1234	0	2	3	2	4	3	6	M	7	H	4	F	7	Q	H	2	6	4
U 160	0	2	3	2	4	3	6	M	7	H	4	F	7	H	H	2	6	4
U 162 (*Seebeckwerft*)	0	2	0	3	5	3	14			H	4	F	7	H	H	4	0	4
U 163 (*Seebeckwerft*)	0	2	0	3	5	0	15			H	4	F	7	H	H	4	0	4
U 170 (*Seebeckwerft*)	0	2	3	2	4	3	14			H	4	F	7	Q	H	?	?	4
U 802 1945 (*Seebeckwerft*)	0	2	3	2	4	3	14			H	4	F	7	Q	H	2	6	4
U 1227, U 1228 1944	0	2	3	2	4	3	6	M	7	H	4	F	7	Q	H	2	6	4
U 805 1945	0	2	3	0	4	Fast df***				H	4	F	7					
U 190 1945	0	2	3	2	0.5	Fast df***				H	4	F	7	Q	1,H	2	6	4
U 530 1945	1	2	3	0	3	Fast df***				H	4	F	7	Q	H	4	0	4
U 858 1945****	0	2	3	2	3	Fast df***				H	4	F	7	H	H,H	2	6	4
U 889 1945*****	0	2	3	2	4	3	6	M	7	H	4	F	7	H	H	2	2	6
U 1231 1945	0	2	3	2	4	3	6	M	7	H	4	F	11				0	4

* These early boats had one vent on the starboard side in A

** U 510 starboard side was different and is discussed later

*** Fast dive foredeck (df) is discussed in Part XIII

**** U 858 had a half vent in place of the normal exhaust outlet area in May 1945 (3 half vents in positions N and O); U 858 also had one half vent added in place of the exhaust outlet, with a half vent on either side

***** Position I on the starboard side of U 889 had the following due to the addition of a plate: one quarter vent, space, one half vent then five vents

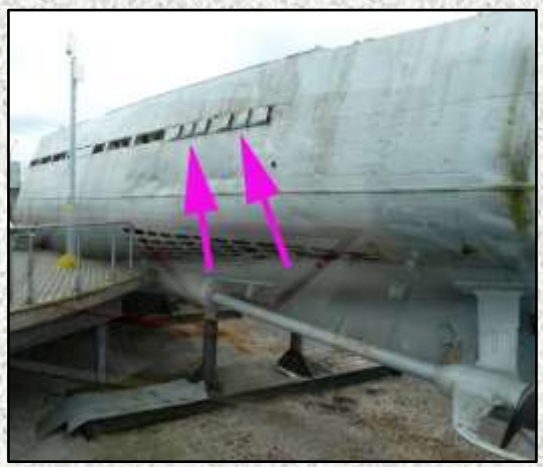
Vent ahead of exhaust outlet - According to page 26 of *Vom Original zum Modell: Uboottyp IXC*, the following IXCs and IXC/40s had a quarter-length vent (Q) directly ahead of the exhaust outlet: U 165 - U 170, U 183 - U 194, U 513 - U 550, U 801 - U 806, U 841 - U 846, U 853 - U 858, U 865 - U 870, U 877 - U 861, U 889 and U 1221 - U 1235. The other IXCs and IXC/40s, as well as the IXAs and IXBs, had a half-length vent (H) ahead of the exhaust outlet.

U 505, as part of the series starting with U 501, originally had the half vent ahead of the exhaust outlet but this changed at some point to a quarter vent. This may possibly have been the result of the changing of the exhaust vent in that a plate would be added over part of the vent, changing it from a half width vent to a quarter width vent. It is quite likely that other boats were similarly changed. Therefore modellers should be aware that in the case of this particular vent the width may not only differ between boats but also change on some boats.

Exhaust outlet - As previously discussed in Part VI, some boats such as U 190, U 858, U 873 and U 1231 had an unbroken line of vents due to the exhaust outlet being moved lower down. This is

reflected in the table above with U 1231 having 11 main vents for a combination of M, N, O and P. U 190 had the exhaust vent changed to one vent. In the case of U 858, one half vent was added in place of the exhaust outlet, with a half vent on either side. This may be due to the exhaust gases being expelled through the *schnorchel* under normal operating conditions.

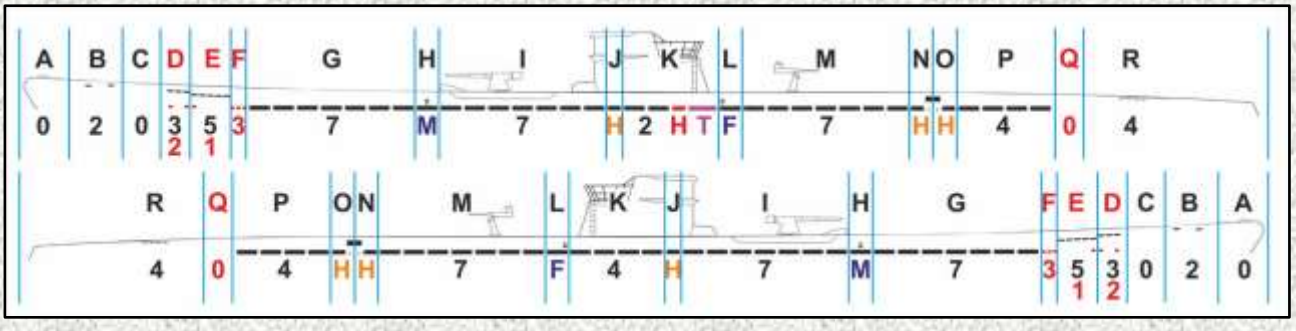
Shrouded vents - A number of later IXCs had sets of small shrouded vents on the forward hull and the stern. The positions these could be found were C, F and Q. The three small shrouds in position F replaced the main vent that was the farthest forward on the main set of vents. On the bow three small shrouds were equivalent in width to one main vent. On the stern six small shrouds were equivalent in width to two main vents.



Above left (70): The rear section of a dissected U 534 at Liverpool. Although the pole obscures this area, we can still see that the quarter-length vent (Q) is ahead of the exhaust outlet area. There is a half-length vent (H) behind where the exhaust outlet would have been. In earlier IXs there were four main vents in position P. In this photo we can see that U 534 had two main vents, with six shrouded vents (shown with the pink arrows) in place of the rear two vents in position Q.

Above right (71): The forward hull of U 534 shows two groups of shrouded vents. The blue arrows point to the three shrouded vents in position C. The green arrow points to three shrouded vents in position F. The shrouds at the front (position C) did not cover the entire vents, which was the case in positions F and Q.

U 510 - There were exceptions such as U 510. The port side was different on this boat in that there was a half and three-quarter vent in position K. The starboard side was normal with four vents in position K. There were extra shrouds below the vents in positions D and E.



Above (72): The vent patterns on U 510 were slightly different on port and starboard sides.

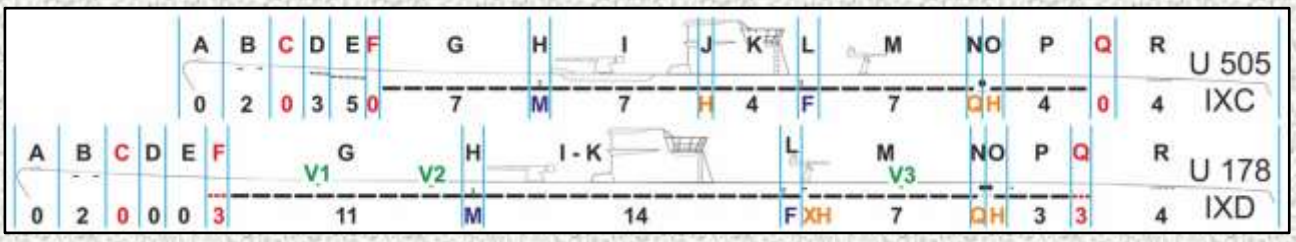
26 extra vents - U 172, U 183 and U 185 had only two main vents in position G. Ahead of this were 26 extra medium-sized vents which moved progressively upwards in a curve as we move forward. On U 183 the sixth vent from the rear was a circle but this was not the case on U 172. The reason for this very visible difference in vents may have been to reduce diving times. This may have been a forerunner of the fast dive foredeck which is discussed on Part XIII. If so then the 26 vents must have not reduced the dividing time by an adequate amount or this feature would have been adopted on other boats and there would have been no need for the fast dive foredeck.

Semi-circles - During early stages of construction, some boats such as U 164, U 1237 and several boats in the U 501 series had some semi-circular gaps above the main vents. These were removed by the time the boats were commissioned into the Kriegsmarine. These semi-circles may have been access covers to allow access to behind the hull casing.

Main hull vent patterns on IXDs

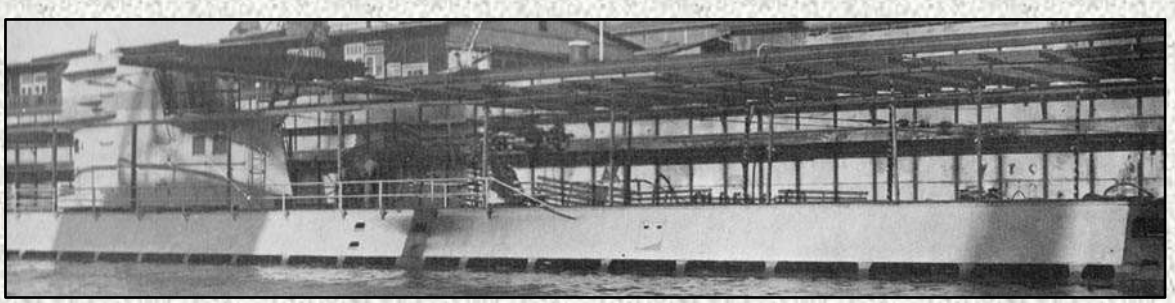
Given that the IXDs were 14% longer than the earlier sub-variants, we would expect the longer boats to have more drainage vents. As can be seen in the comparative drawing below, the IXDs had the equivalent of eight extra main vents. Five extra vents were present ahead of the 105mm deck gun position. The IXDs did not have the half-length hole below the tower but did have an extra set of holes below the 37mm on the aft deck. U 178 and U 181 had three very small vents near top of hull - labelled V1, V2 and V3 below - but other IXDs tended not to have these. The full pattern for the IXD1 U 180 is not known but the exhaust outlet was farther forward (by a distance equivalent to four main vents) than on IXD2s.

Type IXD main vent patterns - port side																
Boats	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I - K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
U 178 (IXD2)	0	2	0	0	0	3	11	M	14	F	X,H,7	Q	H	3	3	4
U 180 (IXD1)														6	6	4



Above (73): The vent patterns of the IXC U 505 can be compared to the much longer IXD2 U 178.

Below (74): The vent patterns on the aft hull casing of the IXD2 U 200 show an extra hole below the rear end of the deck railings. Below this extra hole (X) was a half-length vent (H).



Part VIII - Deck Railings

Another of the features which differs between batches and can be used to identify boats is the set of railings on either side of the deck. Initially the sole purpose was to help prevent crewmen from falling overboard when operating the 105mm deck gun. As time progressed the railings were extended backwards to help prevent crewmen falling overboard when walking around the deck around the tower. When the 37mm was added to the aft deck an extra set of railings was added on some boats or the main railings were extended backwards to cover this area of the aft deck.

Unlike the deck railings which were permanently in place, a set of removable stanchions tended to be temporarily added in place during commissioning ceremonies and the pre-war period. Modellers who are depicting their boat at sea or departing or returning from a wartime patrol would typically not be required to add these removable stanchions. As for the permanent deck railings, these were prone to being bent or broken due to the rigours of an operational patrol.

Page 17 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle is an excellent resource which provides all of the U-boat batches associated with the railing styles for the IXCs. The batches are not replicated here and readers are invited to refer to this book. Only the boats seen by the author are given in this article.

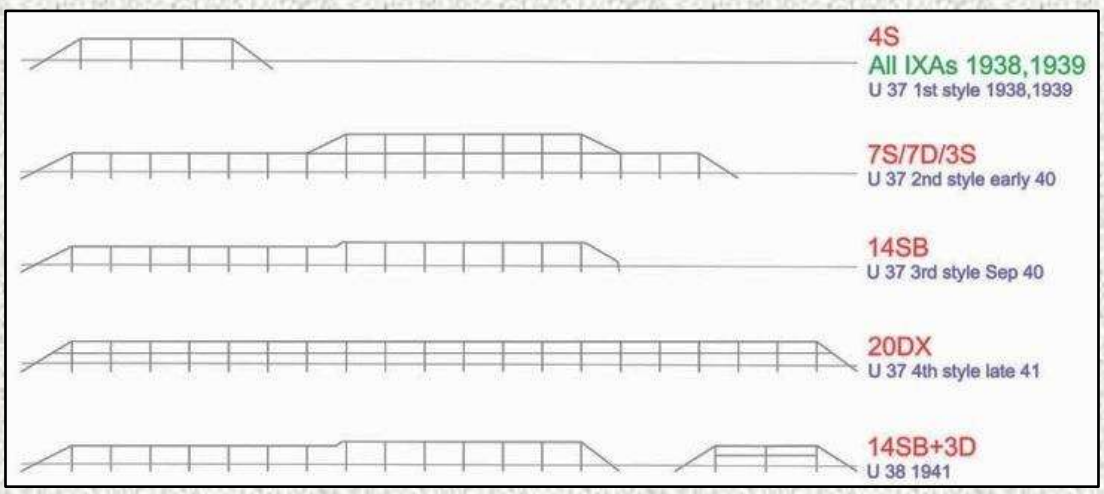
The following codes have been assigned by the author to the hull railing drawings which follow -

- B - **b**end in top bar
- D - **d**ouble horizontals
- S - **s**ingle horizontal
- F - distance between two stanchions much closer due to **f**ootholes
- G - distance between two stanchions slightly closer
- T - **t**riple horizontals
- X - lower horizontal bar goes all the way to the diagonals
- Y - extra two single verticals
- -1 - extra half bar underneath diagonal at rear
- -2 - extra half bars underneath diagonal at front and rear

On the Type IX drawings, the footholes are **only** shown where the distance between the two stanchions are closer due to the footholes. This was the case only with the IXCs and IXDs. On all drawings the **port side** is shown.

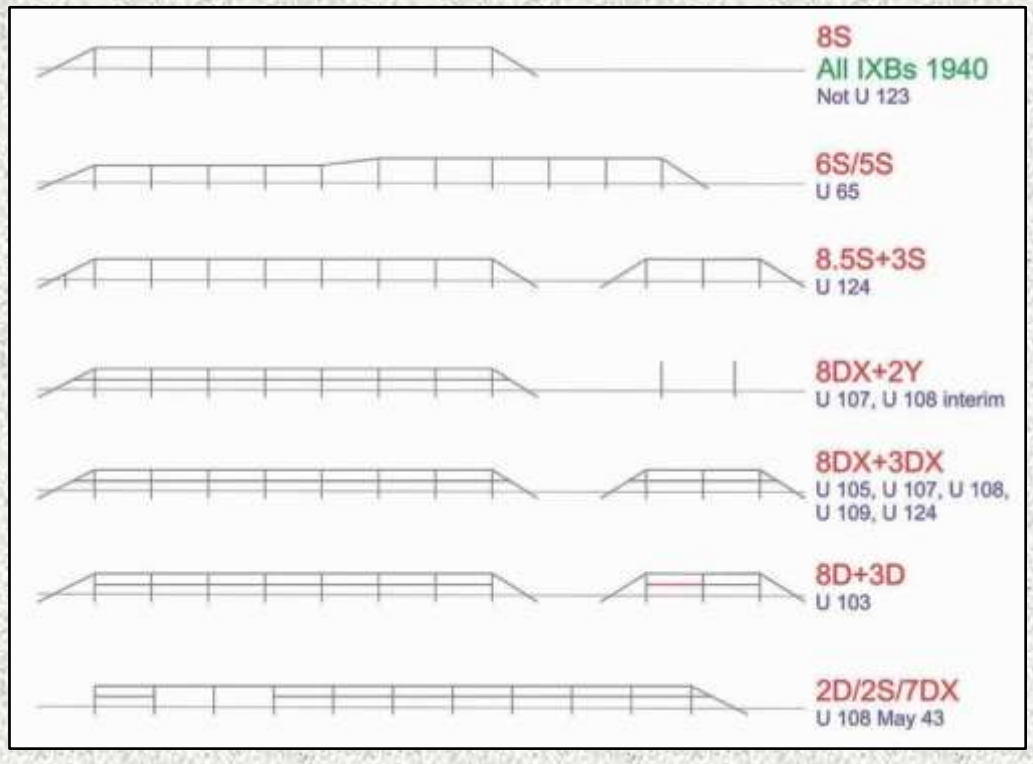
Below (75): The drawing below illustrates how the railings were dramatically increased over time on the IXAs.

Type IXAs



As can be seen in the drawing on the previous page, all IXAs initially had a small set of railings consisting of only four vertical stanchions and a diagonal at each end. These were on either side of the 105mm which was positioned farther forward than on later sub-variants. In early 1940 provision was made on U 37 to have railings around the deck gun and the tower, meaning that crewmen who walked from the tower to the deck gun in heavy seas were more protected. U 37 has been used as an example of how the railing arrangement changed another few times before being settled as 20DX. Initially the railings extended to a much higher position around the tower. This was dispensed with in style 14SB which incorporated a bend roughly in the middle. The final style on U 37 incorporated an additional horizontal bar to help prevent objects or crewmen falling through underneath the top bar. The style on U 38 was different in that a separate set of railings was added around the 37mm when this weapon was added to the aft deck.

Type IXBs



Above (76): U 123 was, for some reason, different from other boats. The red line on U 103 was present on the port side only.

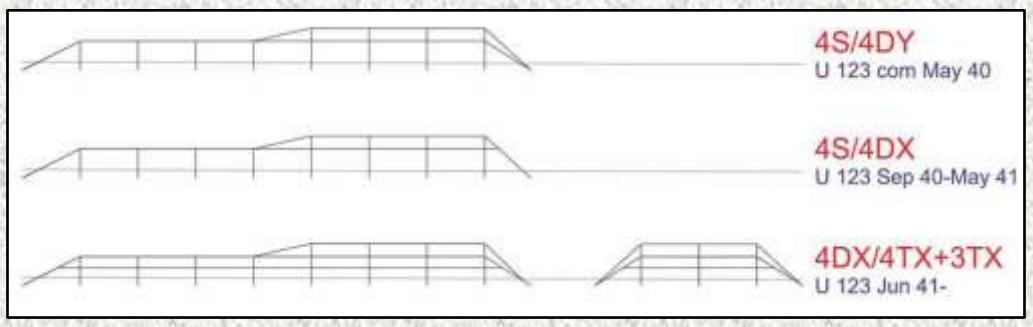
All the Type IXBs, with the exception of U 123, started out with eight vertical stanchions plus the diagonals at either end. The very early U 65 was changed to have the rear section having a more elevated horizontal bar. When the 37mm was about to enter service on the aft deck, it was realised that modifications would have to be made to prevent crewmen falling overboard while operating this weapon. As seen on U 124, an additional set of railings with three vertical stanchions and the diagonals was added at the edges of the aft deck. Typically, as was the case on other IXBs, an additional horizontal bar was added at mid-level which extended all the way to the diagonals (the code X has been used to denote this). U 103 was slightly different in that the mid-level horizontal did not extend beyond the vertical stanchions to the diagonals. There was also a missing horizontal bar at mid-level on the starboard side of the rear set on U 103.

During the commissioning ceremony of U 111 in December 1940, the final IXB did have the 37mm but no rear set of railings. It is expected that the 37mm had been very recently added and that the rear railings would have been added very soon thereafter. On U 107 and U 108 there was an

interim arrangement whereby there were two tall stanchions per side. These were completely inadequate and would have been changed to the normal arrangement soon afterwards.

It is suggested that there was a gap between the main set of railings and the rear set on the aft deck to allow a crewman to easily manoeuvre over the edge of the deck using the two footholes. As per the IXC discussion, this break between the two sets was dispensed with in the mid-war period. For example, by May 1943 U 108 had one long set of railings per side. Some bars were missing, presumably due to some form of damage rather than premeditated design. Crewmen would not find it difficult to climb over these deck railings if they wanted to climb over the deck.

U 123 - The famous IXB U 123, which had a very successful operational career and operated in the post-war French Navy, had several unique railing arrangements. When commissioned in May 1940 there was an additional horizontal bar over the top of the rear half. A slight modification occurred before the first patrol in that the lower diagonal at the rear was replaced with a short horizontal bar extending to the outward diagonal. After the fourth patrol ended in May 1941, the rear end of the main set had a third horizontal bar added to elevate the height. The set of rear railings added on the aft deck also had a third horizontal bar at an elevated height. This arrangement was unique and not incorporated on any other boat. The reason for the triple horizontals may have been to experiment with the railing arrangement.



Above (77): The three unique railing arrangements on the IXB U 123.

Type IXCs

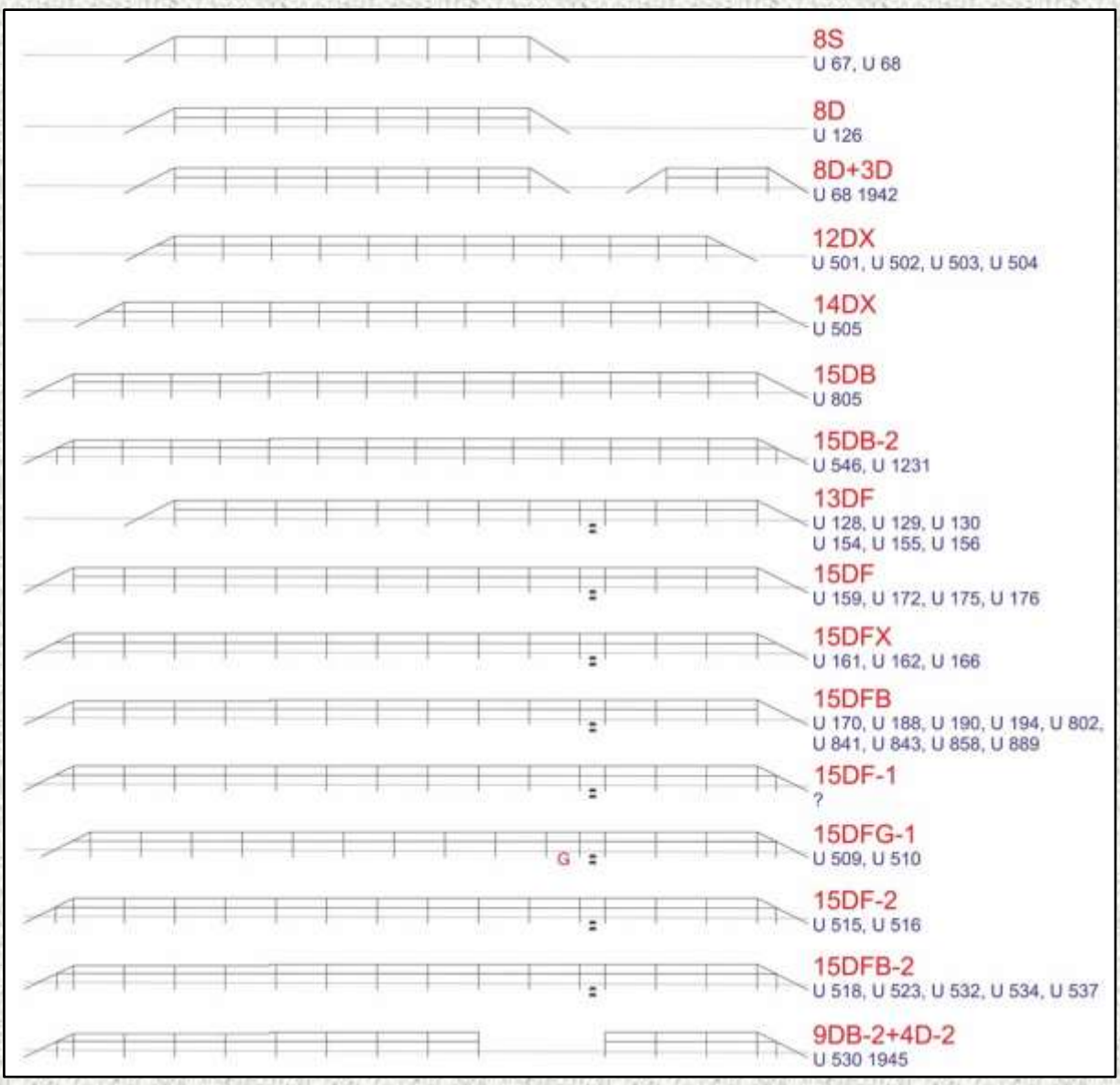
As shown in the drawing on the next page, there was a range of minor differences in the railing arrangements of IXCs. The first three IXCs - U 66, U 67 and U 68 - were all originally outfitted with the same arrangement as on the IXBs (style 8S). An additional horizontal was incorporated into the next IXCs (U 125, U 126 and U 127) to form style 8D. Early boats such as U 68 would have a rear set of railings added when the 37mm was fitted to the aft deck in the same manner as the IXBs. Given that the Kriegsmarine knew that the 37mm would come into service at some point, one longer set of railings which would extend back to the 37mm was adopted. The number of verticals differed between batches. U 501, U 502, U 503 and U 504 were launched with style 12DX but due to length considerations U 505 was fitted with the longer style 14DX. Many other boats would have 15 verticals.

Distance between two verticals above footholes (F and G) - Some batches had the two verticals around the footholes spaced closer together than the other verticals. These batches are marked with the footholes in image 78 to highlight those verticals that were closer together. It is presumed that having two verticals closer together allowed crewmen on deck to identify where the footholes would be on the hull casing. They could then scale the railings at that location and climb down the footholes when necessary. All three shipyards had verticals closer together. This feature was not present on the early IXCs such as U 501 to U 505 but the majority of IXCs did have the verticals closer together. Köhl and Niestle appear to be incorrect in respect to U 501 to U 505 plus U 805 and U 1231; these boats appear to have the verticals evenly spaced rather than closer together.

Bend in top bar (B) - As can be seen below, there was a bend on the top bar of some batches.

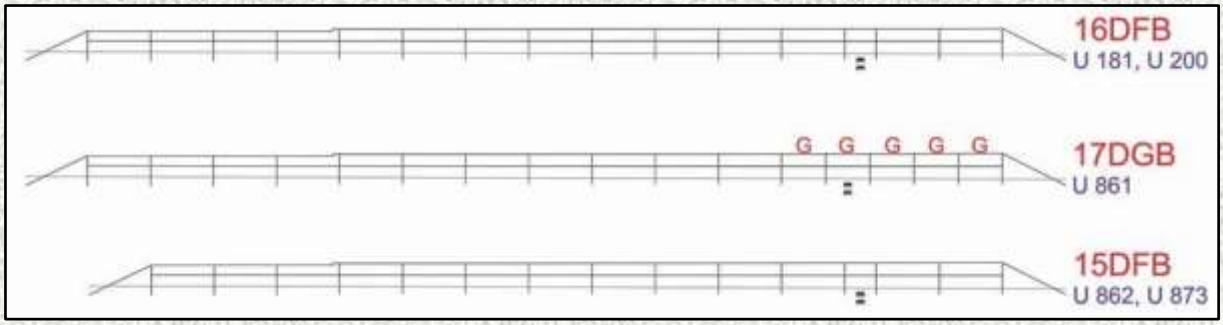
Extra bars at ends - Another point of differentiation can be found at either end of the railings. Some boats had the lower horizontal bar going all the way to the diagonals (X). Others had an extra half bar underneath the diagonal at the rear (-1) while some had extra half bars underneath the diagonal at the front and rear (-2).

15DF-1 - U 509 and U 510 had style 15DFG-1 which had the two verticals ahead of the footholes being narrower in width (G). Köhl and Niestle suggest that U 507 and U 514 had what the author ascribes as 15DF-1 but this is refuted in the case of U 509 and U 510 by period photographs. Might it be possible that U 507 to U 514 had 15DFG-1?



Above (78): U 501 had style 12DX during commissioning rather than style 8S suggested in Köhl and Niestle's excellent book. There are also slight differences in regard to U 505, U 805 and U 1231 as these boats had equidistant distribution between verticals over the footholes. Unlike the earlier sub-variants, the railing arrangements of IXCs did not tend to change over time other than the early boats having a rear set of railings. These were added when the 37mm was adopted on the aft deck in 1941.

Type IXDs



Above (79): The railing styles on several IXDs.

Given the extra length of IXDs compared to earlier sub-variants, it is no surprise that there were slightly longer deck railings. These boats had either 15 or 16 or 17 verticals depending on the individual boat. U 861 was different in that the last six verticals were spaced closer together than the norm (G).

Part IX - Deck Armament

The presence or absence of the 105mm deck gun on the foredeck, 37mm semi-automatic on the aft deck and the 20mm on the aft deck of a few boats will be discussed in this section.

Aft deck

20mm on aft deck - All boats, from U 37 in August 1938 onwards, were commissioned with a round circular plate in this position ready for the fitting of a gun. The early VIIBs had a 20mm mount - minus the barrel - fitted on the aft deck. This mount was fitted as standard and was present on the first VIIB U 45 when commissioned in June 1938. It is unclear why this mount was fitted to all early VIIBs and not the early IXs. It took until 1941 before a 20mm (2cm Flak C/30 gun on a L30/37 mount) was added to the aft deck of Type IXs. A single 20mm was present on the aft deck of U 124 in April 1941, U 105 in June 1941 and U 106 at some point in 1941. These were removed when the 37mm semi-automatic was added to the aft deck. An exception was U 505 which had a single 20mm on the aft deck with a Turm II in July 1943. Another exception was U 188 which had the 20mm mount (without the barrel) on the aft deck with a Turm II in July 1943. The reason for this is unclear but it may be due to the 37mm being in short supply at that particular time.

37mm fitting - As can be found in the table on the next page, the fitting of the 37mm semi-automatic (3.7cm SK C/30 gun on a LC 39 mount) to the aft deck took place at very end of 1940 or the first half of 1941. The 37mm semi-automatic anti-aircraft gun (which could be elevated to almost ninety degrees) is first evidenced by the author on U 111 in December 1940 and replaced the 20mm which had been fitted on some boats. The 37mm semi-automatic became standard and all IX variants had the 37mm in late 1941, 1942 and early 1943. It was present on some boats such as U 193, U 504 and U 532 when they had the Turm II as there was sufficient space behind the tower.

37mm removal - The removal appears to have been completed during spring and summer 1943, though boats sailing on longer patrols would delay the removal. U 168, if the interrogation report is to be believed, sailed on patrol in January 1944 with the 37mm semi-automatic on the aft deck. A number of boats including U 66, U 106, U 124, U 172, U 508 and U 534 had the Turm II tower but no semi-automatic 37mm in photos but it was retained on some IXs with the Turm II. Part of the issue with this semi-automatic weapon is that a long time was required for loading. Given that there

was much improved anti-aircraft armament on the two tower platforms, including an automatic 37mm on the lower platform of Turm IVs, it is quite surprising that it was retained on U 532 when the boat had a Turm IV at the end of the war.

Type IX 37mm evidenced on aft deck in photographs and interrogation reports		
Month	**No**	**Yes**
Pre-war	All IXs	
May 40	U 123	
Jun 40	U 124	
Aug 40	U 64, U 65, U 104	
Sep 40	U 37, U 65, U 105	
Oct 40	U 37, U 108, U 123	
Dec 40	U 109	U 111
Jan 41		U 67
Feb 41	U 103	
Mar 41	U 37, U 38, U 107	U 67, U 126
Apr 41		U 110, U 127, U 501
May 41	U 123	U 107, U 124, U 128
Jun 41		U 123
Jul 41		U 38, U 103, U 108, U 162, U 187
Aug 41		U 124, U 126, U 510, U 505
Oct 41		U 160
Nov 41		U 107, U 131, U 172, U 173, U 174
Dec 41		U 105, U 108, U 175, U 176
Jan 42		U 67
Feb 42		U 66, U 106
Mar 42		U 130, U 502
Apr 42		U 68, U 103, U 126, U 128, U 129, U 183, U 184
May 42		U 123, U 154, U 181
Jun 42		U 38, U 66, U 130, U 182, U 185
Jul 42		U 186, U 187
Aug 42		U 67, U 129, U 172, U 185, U 188, U 189, U 196, U 508, U 512
Sep 42		U 155
Nov 42		U 164, U 172, U 192, U 198, U 199, U 509, U 514, U 517
Dec 42		U 43, U 160, U 191, U 193*, U 522, U 534, U 535
Jan 43		U 182, U 187, U 194*, U 515
Feb 43		U 841
Mar 43		U 130, U 842*, U 523, U 524
Apr 43	U 844*	U 67, U 68, U 160, U 175, U 510, U 528*
May 43	U 67*, U 172*, U 199, U 508*, U 523, U 527*, U 846*	U 108, U 506, U 513
Jun 43	U 185*, U 842, U 853	U 515, U 801
Jul 43	U 180, U 506*, U 533*, U 841*, U 854*	U 154, U 504*, U 518, U 530
Aug 43	U 106*, U 515*, U 536, U 856*, U 801	

Sep 43	U 857*	
Oct 43		U 177*
Dec 43	U 177*	
Jan 44		U 168*
Feb 44	U 541*	
Late war	U 190, U 510, U 516, U 802, U 805, U 858, U 861, U 868, U 870, U 874, U 1231 (all Turm IV)	U 532
Note: *denotes boats with Turm II; boats known to have Turm IV in purple		

Forward deck

Removal of 105mm deck gun - At the start of the war, the 105mm deck cannon (10.5cm SK C/32 on a U-boat LC/36 mount) was used reasonably frequently to sink ships and to preserve valuable torpedoes for future attacks. There was space for 32 ready use 105mm shells in a compartment directly ahead of the magnetic compass fairing. This compartment opened outwards via two wooden hatches with each set of hinges on the outside. By 1943 the opportunity to sink Allied ships using the deck gun was massively reduced and it was decided to remove deck guns from most U-boats.

Evidence of 105mm on forward deck		
Month	**No**	**Yes**
May 43		U 67, U 103, U 108, U 172, U 199, U 508, U 513, U 527, U 530
Jun 43		U 155, U 515
Jul 43		U 154, U 168, U 180, U 509, U 532
Aug 43		U 106, U 172, U 510, U 515
Sep 43		U 66, U 505, U 516
Nov 43	U 107	U 510
Dec 43	U 505	
Jan 44	U 66	U 518, U 801, U 856, U 860
Feb 44	U 801, U 856, U 860	U 516, U 541
Apr 44	U 170, U 550	
May 44	U 170	
Jul 44	U 802	

On the 27th April 1943, an order was issued to remove the deck guns from the forward deck. Despite this order, Type IXs were sailing routinely from Lorient with the 105mm in May, June and July 1943. There were also a number of IXCs which **departed** on patrols from Lorient many months after the order removal date. These included the departures of U 515 at the end of August 1943. U 516 in October 1943, U 518 in January 1944 and U 541 in February 1944. Quite obviously once a boat had sailed the 105mm deck gun would be retained throughout the patrol which could last a few months. Generally speaking we might conclude that, with the exception of boats operating in the Indian Ocean, the 105mm was normally removed from IXs in the latter half of 1943 and in some cases early 1944. U 801, U 856 and U 860 all had the 105mm removed in February 1944.

The 105mm ammunition rack would also be removed from the underside of the foredeck. Despite being superfluous to requirements, the strips around the gun, which helped crewmen keep their feet when operating the gun in high seas, were sometimes retained on the deck.

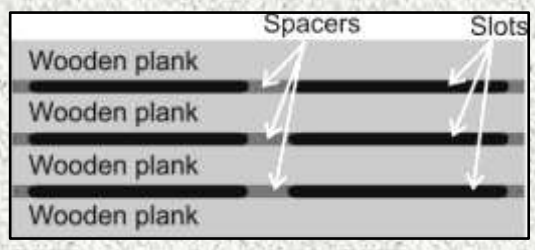
Retention of 105mm deck gun - The IXCs and IXDs which served in the Indian Ocean retained the 105mm. The following IXCs and IXDs served in the Indian Ocean or were part of a large number sunk en route: U 168, U 172, U 177, U 178, U 180, U 181, U 183, U 188, U 195, U 196, U 197, U 198, U 510, U 532, U 533, U 537, U 841, U 847, U 848, U 849, U 850, U 851, U 852, U 859, U 860, U 861, U 862, U 863, U 864, U 865 and U 871. U 511 presumably retained the 105mm when the boat left Lorient in May 1943 to be delivered to Japan. There were some boats of this sub-variant such as U 196, U 199, U 861 and U 883 which did not have the 105mm when they were serving in the Atlantic.

Other combinations - When U 172 returned from patrol on the 7th September 1943, the shipyard changed the 105mm for a 37mm semi-automatic. A member of the crew objected so the shipyard personnel were forced to reinstate the 105mm on the foredeck. When U 172 left on patrol for the Indian Ocean on the 22nd November 1943, the boat had an unusual combination of Turm IV, Vierling and 105mm. U 841 also went on patrol with this combination on its last patrol but the 105mm was due to be removed when they returned from this patrol.

105mm deck gun on aft deck - Unusually the IXD2 U 196, which served in the Indian Ocean, had the 105mm deck gun on the aft deck as well as the foredeck.

37mm on foredeck - A few IXs were fitted with a 37mm semi-automatic (3.7cm SK C/30 gun on a LC/39 mount) on the foredeck in the positioned vacated by the 105mm. This was the case on U 515, U 860 (fitted February 1944) and U 873.

Part X - Deck Type & Details

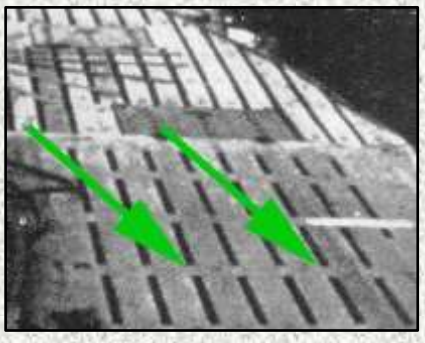


There were two types of wooden deck used upon U-boats - the earlier *slotted* style and the later, more simplified *planked* style. The first U-boats to be built with the planked deck were launched as early as the summer of 1942. However, as there were variations between shipyards, the introduction of the planked decks may have taken place a little later in different yards. The type of wood used is reported to have been East Prussian scotch pine but other types of wood are likely to have also been used.

Above (80): The older slotted type of deck which used spacers at equidistant lengths between the planks.

Below (81): Here can be seen an unusual mix of both types on U 190, with the simplified planked type at the top and the older slotted type at the bottom. The green arrows point to spacers between the planks. Clearly there are no spacers between the planks on the planked type of deck. The planks are reported to have been 80mm wide.

Photographic study and analysis



Given that the deck type was not normally retrofitted to existing boats, we need to ask when the changeover from slotted to planked took place on new built U-boats. A study of deck types on Type VIICs and VIIC/41s can be found in the author's article *Late War Type VIIC & VIIC/41 Configurations*. The implementation dates for the VIIC and VIIC/41 decks in this article will be provided for comparison as it may inform out study of the deck type on Type IXs. Using the same methodology, the author determined the following dates on Type IXs as found in the table in the pages which follow.

The following codes have been used in the table -

- SD = Slotted Deck
- PD = Planked Deck

When bold print has been used, the deck type has been identified on a particular boat in a period photograph. Regular print has been used when the deck type is assumed to have featured on the U-boat. An example of how such assumptions have been made is as follows. It is known through photographic evidence that U 527 and U 532 both featured the slotted deck. Since both boats were within the same batch from the same shipyard, it can be reasonably assumed that all boats in between (U 528, U 529, U 530 and U 531) also had the slotted deck. Boxes that have been left blank are when no reasonable assumptions can be made with the current resources. The entries in red font colour are the earliest and latest known examples of deck type.

Type IX deck type				
Boat	**Variant**	**Shipyard**	**Launch date**	**Deck type**
U 37	IXA	A G Weser, Bremen	14/05/38	**SD**
U 38	IXA	A G Weser, Bremen	09/08/38	**SD**
U 39	IXA	A G Weser, Bremen	22/09/38	**SD**
U 40	IXA	A G Weser, Bremen	09/11/38	**SD**
U 41	IXA	A G Weser, Bremen	20/01/39	**SD**
U 42	IXA	A G Weser, Bremen	16/02/39	SD
U 43	IXA	A G Weser, Bremen	23/05/39	**SD**
U 44	IXA	A G Weser, Bremen	05/08/39	**SD**
U 64	IXB	A G Weser, Bremen	20/09/39	**SD**
U 65	IXB	A G Weser, Bremen	06/11/39	**SD**
U 122	IXB	A G Weser, Bremen	30/12/39	SD
U 123	IXB	A G Weser, Bremen	02/03/40	**SD**
U 124	IXB	A G Weser, Bremen	09/03/40	**SD**
U 103	IXB	A G Weser, Bremen	12/04/40	**SD**
U 104	IXB	A G Weser, Bremen	25/05/40	**SD**
U 105	IXB	A G Weser, Bremen	15/06/40	**SD**
U 106	IXB	A G Weser, Bremen	17/06/40	**SD**
U 107	IXB	A G Weser, Bremen	02/07/40	**SD**
U 108	IXB	A G Weser, Bremen	15/07/40	**SD**
U 109	IXB	A G Weser, Bremen	14/09/40	**SD**
U 110	IXB	A G Weser, Bremen	25/08/40	**SD**
U 111	IXB	A G Weser, Bremen	06/09/40	**SD**
U 66	IXC	A G Weser, Bremen	10/10/40	**SD**
U 67	IXC	A G Weser, Bremen	30/10/40	**SD**
U 68	IXC	A G Weser, Bremen	22/11/40	**SD**
U 125	IXC	A G Weser, Bremen	10/12/40	**SD**
U 126	IXC	A G Weser, Bremen	31/12/40	**SD**
U 501	IXC	Deutsche Werft, Hamburg	25/01/41	SD
U 127	IXC	A G Weser, Bremen	04/02/41	**SD**
U 502	IXC	Deutsche Werft, Hamburg	18/02/41	**SD**
U 128	IXC	A G Weser, Bremen	20/02/41	**SD**
U 129	IXC	A G Weser, Bremen	28/02/41	**SD**
U 161	IXC	Seebeckwerft, Bremerhaven	01/03/41	**SD**
U 162	IXC	Seebeckwerft, Bremerhaven	01/03/41	**SD**

U 163	IXC	Seebeckwerft, Bremerhaven	01/05/41	**SD**
U 164	IXC	Seebeckwerft, Bremerhaven	01/05/41	**SD**
U 130	IXC	A G Weser, Bremen	14/03/41	**SD**
U 131	IXC	A G Weser, Bremen	01/04/41	**SD**
U 153	IXC	A G Weser, Bremen	05/04/41	SD
U 503	IXC	Deutsche Werft, Hamburg	05/04/41	SD
U 195	IXD1	A G Weser, Bremen	08/04/41	**SD**
U 154	IXC	A G Weser, Bremen	21/04/41	**SD**
U 504	IXC	Deutsche Werft, Hamburg	24/04/41	**SD**
U 155	IXC	A G Weser, Bremen	12/05/41	**SD**
U 156	IXC	A G Weser, Bremen	21/05/41	**SD**
U 505	IXC	Deutsche Werft, Hamburg	24/05/41	**SD**
U 157	IXC	A G Weser, Bremen	05/06/41	**SD**
U 506	IXC	Deutsche Werft, Hamburg	20/06/41	**SD**
U 158	IXC	A G Weser, Bremen	21/06/41	SD
U 159	IXC	A G Weser, Bremen	01/07/41	**SD**
U 160	IXC	A G Weser, Bremen	12/07/41	**SD**
U 507	IXC	Deutsche Werft, Hamburg	15/07/41	**SD**
U 508	IXC	Deutsche Werft, Hamburg	30/07/41	**SD**
U 171	IXC	A G Weser, Bremen	22/07/41	SD
U 172	IXC	A G Weser, Bremen	05/08/41	**SD**
U 173	IXC	A G Weser, Bremen	11/08/41	SD
U 165	IXC	Seebeckwerft, Bremerhaven	15/08/41	SD
U 174	IXC	A G Weser, Bremen	21/08/41	**SD**
U 175	IXC	A G Weser, Bremen	02/09/41	**SD**
U 176	IXC	A G Weser, Bremen	12/09/41	**SD**
U 509	IXC	Deutsche Werft, Hamburg	19/09/41	**SD**
U 510	IXC	Deutsche Werft, Hamburg	04/09/41	**SD**
U 511	IXC	Deutsche Werft, Hamburg	22/09/41	SD
U 177	IXD2	A G Weser, Bremen	01/10/41	**SD**
U 512	IXC	Deutsche Werft, Hamburg	09/10/41	**SD**
U 178	IXD2	A G Weser, Bremen	28/10/41	**SD**
U 513	IXC	Deutsche Werft, Hamburg	29/10/41	**SD**
U 166	IXC	Seebeckwerft, Bremerhaven	01/11/41	**SD**
U 179	IXD2	A G Weser, Bremen	18/11/41	SD
U 514	IXC	Deutsche Werft, Hamburg	18/11/41	SD
U 515	IXC	Deutsche Werft, Hamburg	02/12/41	**SD**
U 180	IXD1	A G Weser, Bremen	10/12/41	SD
U 516	IXC	Deutsche Werft, Hamburg	16/12/41	**SD** (1941) / **PD** (1945)
U 517	IXC	Deutsche Werft, Hamburg	30/12/41	SD
U 181	IXD2	A G Weser, Bremen	30/12/41	**SD**
U 183	IXC/40	A G Weser, Bremen	09/01/42	**SD**
U 184	IXC/40	A G Weser, Bremen	21/02/42	SD
U 518	IXC	Deutsche Werft, Hamburg	11/02/42	**SD**
U 519	IXC	Deutsche Werft, Hamburg	12/02/42	SD
U 520	IXC	Deutsche Werft, Hamburg	02/03/42	SD
U 185	IXC/40	A G Weser, Bremen	02/03/42	**SD**
U 182	IXD2	A G Weser, Bremen	03/03/42	SD
U 167	IXC/40	Seebeckwerft, Bremerhaven	05/03/42	SD

U 168	IXC/40	Seebeckwerft, Bremerhaven	05/03/42	SD
U 186	IXC/40	A G Weser, Bremen	11/03/42	**SD**
U 187	IXC/40	A G Weser, Bremen	16/03/42	**SD**
U 521	IXC	Deutsche Werft, Hamburg	17/03/42	SD
U 188	IXC/40	A G Weser, Bremen	31/03/42	**SD**
U 522	IXC	Deutsche Werft, Hamburg	01/04/42	SD
U 196	IXD2	A G Weser, Bremen	24/04/42	**SD**
U 523	IXC	Deutsche Werft, Hamburg	15/04/42	**SD**
U 524	IXC	Deutsche Werft, Hamburg	30/04/42	SD
U 189	IXC/40	A G Weser, Bremen	01/05/42	SD
U 525	IXC/40	Deutsche Werft, Hamburg	20/05/42	SD
U 197	IXD2	A G Weser, Bremen	21/05/42	SD
U 526	IXC/40	Deutsche Werft, Hamburg	03/06/42	SD
U 527	IXC/40	Deutsche Werft, Hamburg	03/06/42	**SD**
U 169	IXC/40	Seebeckwerft, Bremerhaven	06/06/42	SD
U 170	IXC/40	Seebeckwerft, Bremerhaven	06/06/42	**SD**
U 190	IXC/40	A G Weser, Bremen	08/06/42	**SD** (1942) / **PD** (1945)
U 198	IXD2	A G Weser, Bremen	15/06/42	**SD**
U 528	IXC/40	Deutsche Werft, Hamburg	01/07/42	SD
U 191	IXC/40	A G Weser, Bremen	03/07/42	SD
U 199	IXD2	A G Weser, Bremen	12/07/42	**SD**
U 529	IXC/40	Deutsche Werft, Hamburg	15/07/42	SD
U 530	IXC/40	Deutsche Werft, Hamburg	28/07/42	SD
U 192	IXC/40	A G Weser, Bremen	31/07/42	**SD**
U 531	IXC/40	Deutsche Werft, Hamburg	12/08/42	SD
U 200	IXD2	A G Weser, Bremen	20/08/42	**SD**
U 193	IXC/40	A G Weser, Bremen	24/08/42	SD
U 532	IXC/40	Deutsche Werft, Hamburg	26/08/42	**SD**
U 847	IXD2	A G Weser, Bremen	05/09/42	SD
U 533	IXC/40	Deutsche Werft, Hamburg	11/09/42	
U 194	IXC/40	A G Weser, Bremen	22/09/42	SD
U 534	IXC/40	Deutsche Werft, Hamburg	23/09/42	**PD**
U 848	IXD2	A G Weser, Bremen	06/10/42	**SD**
U 535	IXC/40	Deutsche Werft, Hamburg	08/10/42	**PD**
U 841	IXC/40	A G Weser, Bremen	21/10/42	
U 536	IXC/40	Deutsche Werft, Hamburg	21/10/42	**PD**
U 849	IXD2	A G Weser, Bremen	31/10/42	
U 801	IXC/40	Seebeckwerft, Bremerhaven	31/10/42	
U 802	IXC/40	Seebeckwerft, Bremerhaven	31/10/42	**PD**
U 537	IXC/40	Deutsche Werft, Hamburg	07/11/42	**PD**
U 842	IXC/40	A G Weser, Bremen	14/11/42	
U 538	IXC/40	Deutsche Werft, Hamburg	20/11/42	PD
U 539	IXC/40	Deutsche Werft, Hamburg	04/12/42	**PD**
U 850	IXD2	A G Weser, Bremen	07/12/42	**PD**
U 843	IXC/40	A G Weser, Bremen	15/12/42	PD
U 540	IXC/40	Deutsche Werft, Hamburg	18/12/42	PD
U 844	IXC/40	A G Weser, Bremen	30/12/42	**PD**
U 541	IXC/40	Deutsche Werft, Hamburg	05/01/43	PD
U 851	IXD2	A G Weser, Bremen	15/01/43	**PD**

U 542	IXC/40	Deutsche Werft, Hamburg	19/01/43	PD
U 845	IXC/40	A G Weser, Bremen	22/01/43	PD
U 852	IXD2	A G Weser, Bremen	28/01/43	**PD**
U 859	IXD2	A G Weser, Bremen	02/03/43	PD
U 543	IXC/40	Deutsche Werft, Hamburg	03/03/43	PD
U 846	IXC/40	A G Weser, Bremen	17/02/43	PD
U 544	IXC/40	Deutsche Werft, Hamburg	17/02/43	PD
U 545	IXC/40	Deutsche Werft, Hamburg	03/03/43	PD
U 853	IXC/40	A G Weser, Bremen	11/03/43	**PD**
U 546	IXC/40	Deutsche Werft, Hamburg	17/03/43	PD
U 860	IXD2	A G Weser, Bremen	23/03/43	PD
U 803	IXC/40	Seebeckwerft, Bremerhaven	01/04/43	PD
U 804	IXC/40	Seebeckwerft, Bremerhaven	01/04/43	PD
U 547	IXC/40	Deutsche Werft, Hamburg	03/04/43	**PD**
U 854	IXC/40	A G Weser, Bremen	05/04/43	PD
U 548	IXC/40	Deutsche Werft, Hamburg	14/04/43	**PD**
U 855	IXC/40	A G Weser, Bremen	17/04/43	PD
U 549	IXC/40	Deutsche Werft, Hamburg	28/04/43	PD
U 861	IXD2	A G Weser, Bremen	29/04/43	**PD**
U 805	IXC/40	Seebeckwerft, Bremerhaven	05/43	**PD**
U 1221	IXC/40	Deutsche Werft, Hamburg	02/05/43	PD
U 856	IXC/40	A G Weser, Bremen	11/05/43	PD
U 550	IXC/40	Deutsche Werft, Hamburg	12/05/43	**PD**
U 857	IXC/40	A G Weser, Bremen	23/05/43	**PD**
U 806	IXC/40	Seebeckwerft, Bremerhaven	06/43	**PD**
U 862	IXD2	A G Weser, Bremen	05/06/43	**PD**
U 1222	IXC/40	Deutsche Werft, Hamburg	09/06/43	PD
U 1223	IXC/40	Deutsche Werft, Hamburg	16/06/43	PD
U 858	IXC/40	A G Weser, Bremen	17/06/43	**PD**
U 863	IXD2	A G Weser, Bremen	29/06/43	PD
U 1224	IXC/40	Deutsche Werft, Hamburg	07/07/43	PD
U 865	IXC/40	A G Weser, Bremen	11/07/43	PD
U 1225	IXC/40	Deutsche Werft, Hamburg	21/07/43	PD
U 866	IXC/40	A G Weser, Bremen	29/07/43	PD
U 864	IXD2	A G Weser, Bremen	12/08/43	**PD**
U 1226	IXC/40	Deutsche Werft, Hamburg	21/08/43	PD
U 867	IXC/40	A G Weser, Bremen	24/08/43	PD
U 871	IXD2	A G Weser, Bremen	07/09/43	PD
U 868	IXC/40	A G Weser, Bremen	18/09/43	**SD**
U 1227	IXC/40	Deutsche Werft, Hamburg	18/09/43	PD
U 1228	IXC/40	Deutsche Werft, Hamburg	02/10/43	PD
U 869	IXC/40	A G Weser, Bremen	05/10/43	**PD**
U 872	IXD2	A G Weser, Bremen	20/10/43	PD
U 1229	IXC/40	Deutsche Werft, Hamburg	22/10/43	PD
U 870	IXC/40	A G Weser, Bremen	29/10/43	**PD**
U 1230	IXC/40	Deutsche Werft, Hamburg	08/11/43	PD
U 873	IXD2	A G Weser, Bremen	16/11/43	**PD**
U 1231	IXC/40	Deutsche Werft, Hamburg	18/11/43	PD
U 877	IXC/40	A G Weser, Bremen	10/12/43	**PD**

U 1232	IXC/40	Deutsche Werft, Hamburg	20/12/43	PD
U 874	IXD2	A G Weser, Bremen	21/12/43	**PD**
U 1233	IXC/40	Deutsche Werft, Hamburg	23/12/43	**PD**
U 878	IXC/40	A G Weser, Bremen	06/01/44	PD
U 1234	IXC/40	Deutsche Werft, Hamburg	07/01/43	PD
U 879	IXC/40	A G Weser, Bremen	11/01/44	PD
U 1235	IXC/40	Deutsche Werft, Hamburg	25/01/43	PD
U 880	IXC/40	A G Weser, Bremen	10/02/44	PD
U 875	IXD2	A G Weser, Bremen	16/02/44	**PD**
U 876	IXD2	A G Weser, Bremen	29/02/44	PD
U 881	IXC/40	A G Weser, Bremen	04/03/44	PD
U 889	IXC/40	A G Weser, Bremen	05/04/44	**PD**

Implementation period

Implementation on VIICs and VIIC/41s - The author's VIIC and VIIC/41 study concluded that the first planked deck can be seen in period photos of the VIIC U 360 launched in July 1942. Furthermore, it was determined that the final slotted deck can be found in period photos of the VIIC U 745 launched in April 1943. In general, the previous study theorised that the process of implementing the planked deck on new VIICs began on boats launched in July 1942 and that by December 1942 most VIICs were being launched with the planked deck. Yet the changeover process extended over a relatively long time period given that the slotted deck featured on U 745 launched in April 1943.

Implementation on IXs - The first observed instance of the planked deck on IXs was U 534 on the 23rd September 1942 and the final observed instance of the slotted deck on IXs was U 848 on the 6th October 1942. Given that the Type IXs were built within only three shipyards, it has been considered beneficial to examine the changeover separately between shipyards. As covered in the table below, new build IXs appear to have had a relatively narrow changeover period in autumn 1942. The changeover period was much longer on the VIICs and VIIC/41s, perhaps due to this type being produced in many more shipyards.

Type IX deck style per shipyard			
Shipyard	**Last observed slotted deck**	**Boats in between (unknown style)**	**First observed planked deck**
A G Weser	U 848 - 06/10/42	U 841 - 21/10/42 U 849 - 30/10/42 U 842 - 14/11/42	U 850 - 07/12/42
Seebeckwerft	U 170 - 06/06/42	U 801 - 31/10/42	U 802 - 31/10/42
Deutsche Werft	U 532 - 26/08/42	U 533 - 11/09/42	U 534 - 23/09/42

A G Weser - All boats up to and including U 848 had the slotted deck; all boats from U 850 had the planked deck. It is unclear which style was on U 841, U 849 and U 842.

Seebeckwerft - All boats up to and including U 170 had the slotted deck; all boats from U 802 had the planked deck. It is expected that U 801 had the planked deck as this boat was launched on the same day as U 802.

Deutsche Werft - All boats up to and including U 532 had the slotted deck; all boats from U 850 had the planked deck. It is unclear which style was on U 533.

U 868 - Period photos show U 868, which was launched on the 18th September 1943, had a slotted deck in photos. Given the launch date, this example is an outlier which we would expect to have been a planked deck. It is possible that there is incorrect labelling and the photo shows a different boat but we cannot presume this to be the case.

Change of deck style

While other modifications would be retrofitted to existing boats, the installation of the planked deck normally only took place on newly-built boats and retrofitting to the new planked style was not normally considered worthwhile in terms of financial and manpower expenditure. Therefore, boats which were launched with the slotted deck would typically keep their slotted deck until their demise. There would be exceptions for boats with battle damage or when the fast deck foredeck was fitted. In these cases, the areas of the deck which needed to be replaced would be fitted with the latest standard of decking, which would be the planked style after the autumn of 1942.

U 190 - The majority of the wooden deck on U 190 was changed to the planked deck. Almost certainly this occurred when the fast dive foredeck was added. The boat still retained the slotted deck at the front ahead of the fast dive foredeck and at the sides of the Turm IV tower.

U 516 - U 516 also changed to the planked deck when the fast dive foredeck was added. It is not clear if U 516 retained the slotted deck ahead of the fast dive foredeck and the boat would not necessarily be the same as U 190 in this respect. It is possible that U 516 retained elements of the slotted deck on the rear deck and by the sides of the tower. What is clear is that the hatches at the very rear end of the aft deck - where the lifeboat had previously been - were converted to the newer style of hatches.

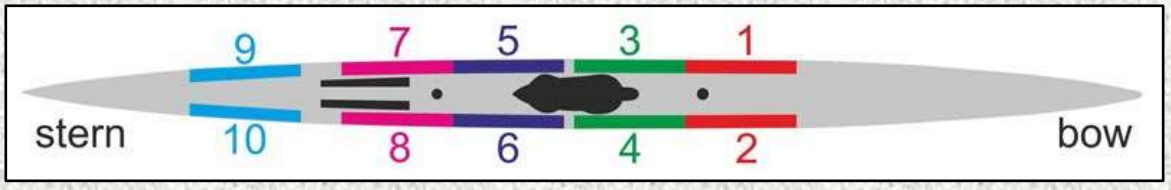
Covers for torpedo storage tubes

Type IXAs, IXBs and IXCs were fitted with ten pressurised storage tubes for spare torpedoes which were housed in the channels running down either side of the deck. There were multiple styles of covers which varied greatly over time.

Below (82): The numbers of the ten storage channels assigned by the author.

Below left (83): Here can be seen the first IXA U 37 with channels 1, 5 and 7 empty on the port side and channels 6 and 8 empty on the starboard side.

Below right (84): Style MB can be seen on U 37, with a pronounced bulge in the middle.



Above left (85): During the commissioning ceremony of U 123 in May 1940, all ten of the covers were style M. The five rows of holes can be seen in position 2, as can the ovals cut out on either side. These metal covers had anti-slip bumps on the surface to help prevent crewmen slipping.

Above right (86): A mix of styles can be seen on the IXB U 103. In channel 1 on the port side is style M and in channel 2 on the starboard side is style 7W. The braces over the top of the wooden planks make this style 7W, as opposed to 7WN which had no top braces. A torpedo container cannot be seen when looking through the gaps in the wooden planks.

The codes assigned by the author to the various styles of torpedo storage tube cover are as follows -

MB - Metal; semi-circular bulge along top; this pre-war type was not widely used, and perhaps only featured on the very earliest Type IXs.
M - Metal; around 33 thin grooves and 5 rows of circular holes running along the length; normally two ovals cut out on both sides; anti-slip bumps on the surface.
MX - Metal; front section had slots despite being metal; rear section had around 33 thin grooves and 5 rows of circular holes; anti-slip bumps along front and rear.
5X - Mixed; 5 wooden planks at the front and metal at the rear; supports underneath; no brace on top.
5WN - Wood; 5 wooden planks; supports underneath; no brace on top.
6WS - Wood; 6 wooden planks with spacers between; supports underneath; no brace on top.
6WN - Wood; 6 wooden planks; supports underneath; no brace on top.
7W - Wood; 7 wooden planks; wooden cross-brace supports underneath; metal brace on top.
7WN - Wood; 7 wooden planks; wooden cross-brace supports underneath; no metal brace on top.
7WS - Wood; 7 wooden planks with spacers between; supports underneath; no brace on top.
7WX - Wood; 7 wooden planks; front section had brace on top; rear section with spacers between.

The letters in the codes have the following characteristics -
W = wood; M = metal; B = bulged; N = no top braces; X = mixed; S = spacers

As discussed later, the IXDs had two extra channels on the foredeck. FS is the code assigned to the extra cover on the starboard foredeck and FP is the code for the extra cover on the port foredeck.

The style 6WS and 7WS are akin to a slotted deck due to spacers between the planks. Style 7W is like a planked deck but had braces on the top surface. Style 5WN, 6WN and 7WN had no top braces and are similar to a planked deck. Style MX was fully metal but did have slots at the front, possibly for crewmen to hold onto when climbing over the side. On U 181 and U 509 the MX on position 9 had the slots at the rear rather than the front. It may be that the cover was able to be fit into place in either direction. As shown in the table which follows, the styles differed widely between boats and are likely to have been interchangeable.

Type IX torpedo storage tube covers											
Boat	**MB**	**M**	**MX**	**5X**	**5WN**	**6WS**	**6WN**	**7W**	**7WN**	**7WS**	**7WX**
U 37 PW	3,4										
U 37	3,4,6	1,2,5,6						1,2,5,6,7,8,9,10			
U 37 LW								3,4,5,6			
U 38	3,4,5,6							1,2,5,6			
U 39 PW									1,2,3,4		
U 40	4	2									
U 41 PW		1,3,4,5,7,9									
U 43 PW		3,4,5,6,7,9									
U 43		1,2,3,4									
U 43 Jul 41								1-10			
U 64		5,6									
U 65		1,2,3,4,5,6						5,7			
U 66		3,4,5,6	1,2								
U 67		1,2,3,4,6,8		1,2,4				7,8,9,10			
U 68		3,4,5,7,8,9,10				1,2					
U 103		1,3,4,5,6,8,10						1,2,4,5,7,8,9,10			
U 104		5,7,8									
U 105		4,6		2							
U 106		1,2,3,4,5,6		1,2	3,4,5,6,7,8				8,10		
U 106 MW									3,4,5,7		
U 107		3,4,5,6		1,2,3	3,4,5,7						
U 107 Nov 43					1,2,3,4						
U 108 1940		1-10									
U 108 1941				1,2	3-10						
U 109		9,10							3,4,5,6,9	3,4	
U 111		1,2,3,4,5,6,7,8,9									
U 122 spring 40		5,6,7,8,9,10									
U 123 May 40		All									
U 123 Nov 40		3,4,5						1,7,9			

U 123 Feb 41		6						1,2,8			
U 123 Apr 41								1-10			
U 123 Jun 41		3,4,5,6						1,2,4, 7, 8,9,10			
U 123 Oct 41			3,5								
U 123 Jan 42								1,2,7,8, 9,10			
U 123 Feb 43			3,4,5					1,2,10			
U 123 Dec 43			5,7					1,9			
U 124		1,2,3,4,5,6,7			7,8,9, 10	1,2		1,2,7, 8,9,10			
U 125		6,7,8,9			4					10	
U 126		1,2,3,4,5,6,7,8						9,10			
U 127		5,6,7,8,9,10									
U 128		7,8	1,2		6,9						
U 129		3,4	1,2	6							
U 130		3,4,5,6,7,8			9						
U 154			1,3,4				5,6				
U 154 1944			3,4						5,6		
U 155		1,2	3,4		1,2,7, 8,9, 10						
U 156		1,3,4,6,7,8	3,4,6,8,10		1,2,5, 9,10			1			
U 159			2,3,5,6, 7,8	1,2							
U 161		1,2,3,4,6,8									
U 162		5,7	1,2				10				
U 163		2,3,4,7,8					5,6				
U 164			3		5						
U 165		8	1,2				6,10				
U 166		3,4,7,8	1			5,6,9,1 0					
U 172			1,2,3,4						7		
U 175			3,4,7,8		5,6, 9,10						
U 176			7,8		5,6, 9,10						
U 177		1,7	FS,1,2,4								
U 178			1,2,3,4,5								
U 181			FS,1,2,3, 4,8,9,10								
U 182			7,8,9,10								
U 183									2		
U 184					6						
U 187			7,8		9						
U 188			1,2,3,4								
U 190									5,7,9		

U 193			7,8,9				5				
U 198			5,7								
U 199			FP,FS, 7,8,9								
U 200			1,2,3,4,6, 7,8,9,10								
U 501		7									
U 502						5,9,10					
U 504		2,3,4,6									
U 505 Aug 41		7,8								5,6	
U 505 Dec 42			1,2,3								
U 505 Jun 44		5,6						1,7,8	3,4		9,10
U 509		1,3,7	4,5,8,9							3,10	
U 510								1		9,10	
U 512		3	1								
U 514			1,2								
U 515			1								
U 516			1,3,7						1,2,4,5		
U 516 Feb 44									1,2,4		
U 527		1,2									
U 532			7,8,9,10						5,6		
U 534 Dec 42			1,2							5,6	
U 534 1944							1,3,4			5,6	
U 539										5,6	
U 547									3,5,6		
U 805			9						5,6,7		
U 806											
U 841							7,9				
U 844									5,6		
U 852			6,7								
U 853			7						5		
U 862			3						5		
U 868				1	2				5,6		
U 869			7						1,2,10		
U 874									FP,FS,1,2		
U 889									1-10		
LW = late war; MW = mid-war; PW = pre-war; no code = wartime Note: Sometimes it can be difficult to differentiate between M and MX in photos.											

As can be seen by the table above, there was no dominant style and styles varied between shipyard and batch. The most common style in the pre-war period was MB, which had a noticeable bulge running down the middle of the cover. It is likely that all IXAs were originally outfitted with this style but it was replaced by other styles in the early war period. The next style that became very common was the metal style M. U 123 and U 111 were fitted exclusively with this cover style during their commissioning ceremonies in May 1940 and December 1940 respectively. Style 7W then became popular on the early war IXs, though it was frequently mixed with other styles such as style M. It was not uncommon for adjacent channels to be different in style, for example U 103 had M in channel 1 and 7W in channel 2 at one point in time. Style MX became very common and was frequently employed with style 7WN in the mid-to-late war period.

According to interrogation reports, the number of torpedoes actually carried in the containers (in addition to those carried in the bow and stern torpedo compartments) were as follows -

- U 66 - 6 torpedoes carried in July 1942
- U 162 - 2 torpedoes carried in July 1942
- U 128 - 8 torpedoes carried in November 1942
- U 164 - 8 torpedoes carried in November 1942
- U 517 - 8 torpedoes carried in November 1942
- U 512 - 4 torpedoes carried in August 1942
- U 187 - 6 torpedoes carried in January 1943
- U 128 - 8 torpedoes carried in April 1943
- U 528 - 6 torpedoes carried in April 1943
- U 513 - 6 torpedoes carried in May 43
- U 527 - 6 torpedoes carried in May 43
- U 515 - 0 torpedoes carried in August 1943
- U 843 - 0 torpedoes carried in October 1943
- U 515 - 2 torpedoes carried in November 1943
- U 66 - 6 torpedoes carried in January 1944
- U 801 - 2 torpedoes carried in February 1944
- U 856 - 0 torpedoes carried in February 1944
- U 68 - 3 torpedoes carried in March 1944
- U 877 - 0 torpedoes carried in November 1944
- U 533 - 0 torpedoes carried in 1945

From the above we can determine that that not all ten were utilised in 1942 and progressively fewer were used by 1944. One contributing reason for the fewer torpedoes carried may be that some of the torpedo containers were removed. The torpedo containers were removed from the following boats -

- U 501 - 6 removed in September 1941
- U 841 - all removed in May and June 1943
- U 856 - 8 removed in February 1944 (none left at this point)
- U 68 - 3 removed prior to departure in March 1944
- U 515 - 3 removed prior to departure in March 1944
- U 805 - all remaining removed in February 1945

As per the U 110 interrogation report, this IXB boat had no containers at all during the first patrol and the decision was left to individual commanders as to how many containers would be carried during a patrol. Type IXs did not automatically carry ten additional torpedoes. It took time to move each torpedo out from the container and into the bow or stern torpedo compartments, during which the boat was perilously exposed to air attack. As the war progressed, air attack increasingly became an existential danger in the Atlantic and commanders would typically carry fewer torpedoes in the external containers. It was also true that U-boats were very much less successful than in the so-called Happy Times and were sinking far fewer ships. If U-boats were expending fewer torpedoes then the crew was more likely to arrive back at port (if they were lucky enough to return) with torpedoes remaining. Crews were less likely to need as many torpedoes in the containers or any at all.

As well as having the torpedo containers removed, the U 110 report also states that metal covers were replaced by wood. This suggests the possibility that wooden covers were used when there was no torpedo stored or when the torpedo container was removed and that metal was used when a torpedo container was present. This would explain why more wood covers can be seen in

the late war period and why the torpedo containers cannot be seen when looking through the gaps in the planks on some photos of wooden covers.

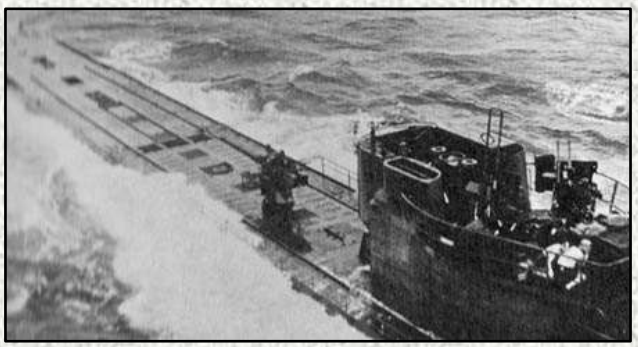
U 123 - U 123 can be used as an example of the multiple changes over time to torpedo covers. When the IXB was commissioned in May 1940 there were ten covers of style M. Later in 1940 there was a mix of M and 7W. By April 1941 all ten covers were style 7W. By June 1941 some channels were style M again. A few months later a mix of style MX and 7W was employed. Clearly it was easy to change these covers which may have been interchangeable.

U 505 - U 505 is an example of a variety of styles being used over time. Style M and 7WS were used in August 1941. By December 1942 style MX was used following significant damage to the aft deck from air attack the previous month. During the capture in June 1944 U 505 had a mix of four different styles: M, 7W, 7WS and 7WX. In channels 3 and 4 there were two sections with planks running only half the length of the channel.

Type IXDs - Due to the 14% extra length, this sub-variant had an extra two torpedo storage containers on the foredeck (FS and FP). The IXDs quite often had a mix of style MX and 7WN but there was no standardisation. The following can be determined from interrogation reports -

- U 199 carried 12 torpedoes in all 12 containers in May 1943.
- U 185 had 8 containers (rather than the total of 12 possible containers) in which all eight had torpedoes in June 1943.
- U 177 retained all 10 containers in January 1944.
- U 860 had the containers full of spare parts when departing for Penang in April 1944.
- U 873 still had 4 deck containers in use in May 1945, meaning 8 had been removed.

It may be that long range boats were more likely to retain the containers as they were serving in regions where air attacks were less likely and there was more of an opportunity to move the torpedoes into the compartments.



Left (87): In this photo of the IXD2 U 848 in November 1943, we can see the torpedo channels extending way beyond the 105mm deck gun in channels FS and FP.

Late war - When the *schnorchel* was added to the starboard side of the foredeck in the late war period, there was no space for channels 2 and 4. Boats which had the fast dive foredeck (discussed in Part XIII) and the torpedo rails had channel 1 removed.

Covers on 1/72nd scale Revell kits

05114 - In this first Revell IXC kit to be released, the model U 505 is close to the real U 505 except that 8 planks were used rather than the real 7 planks. The style they employed (8WN) is inaccurate and was not used on any real boats. The reason why Revell also used 8WN* (another inaccurate style where the supports were less visible) is unclear.

05133 - The same mistake was made in the second Revell IXC kit (late war U 190) to be released.

05166 - Due to wide variety of different styles and the mix of styles in various channels, there is no possible way that Revell could cater for both U 67 and U 154, nor indeed for other IXCs.

Type IX torpedo storage tube covers on Revell kits										
Boat / kit	**M**	**MX**	**6WN**	**7W**	**7WN**	**7WX**	**8W**	**8WN**	**8WN***	**8WX**
Real U 505 Jun 44	5,6			1,7,8	3,4	9,10				
Revell 05114 U 505 Jun 44		5,6					7,8	3,4	1,2	9,10
Real U 190 1945					5,7,9					
Revell 05133 U 190 1945								5-10		
Real U 67 1941	1-4									
Real U 154		1,3,4	5,6							
Revell 05166 U 67 / U 154		1-6		7,8	9,10					
8WN = supports visible; 8WN* = support less visible										

Deck hatches

Watertight ammunition hatches / grills - On Type IXs there were two watertight ammunition hatches. On the forward deck the hatch was on the port side of the deck, just behind the forward bollards. On the aft deck the hatch was in the centre position quite far aft. On some boats these watertight hatches were replaced by a large grill with bars or with the same shape but with square holes. This feature was mostly circular in shape but one end was square ended.

Hatch or grill on decks				
Time period	**Watertight hatch**	**Grill with bars**	**Square holes**	**Grill or square holes**
1941	U 108, U 123			
1942				
Jun 42	U 516	U 185		
Sep 42	U 155			
Nov 42			U 108	
Dec 42		U 123, U 514		
May 43				U 172
Jul 43		U 532		U 154
Sep 43	U 857		U 508	
Unknown		U 170, U 196, U 511, U 532, U 841	U 67, U 510	

The grill or square hole feature was retrofitted to existing IXs in the late 1942 and it is assumed that they would be fitted to both the forward and aft decks. For an unknown reason U 172 and U 514 dispensed with the watertight ammunition hatches in favour of the grill even when they retained the 105mm deck gun.

Starboard foredeck - At the very front end of the wooden foredeck, on the starboard side, there was another feature which changed over time. The earliest boats had no hatch or grill in this area. U 128 and U 163 had a large metal hatch without a grill. In June 1943, U 185 and U 188 had a large

rectangular grill which is like the grill on Revell's early war kit (05166).

A round waterproof hatch (the same style as ammunition hatches) was present in this area of late war boats such as U 190, U 806, U 848, U 858 and U 889 in 1945. It was present on U 505 when captured in June 1944 and features on Revell's U 505 kit (05114). This round hatch was not present on U 534 in 1943 but was present on this boat later in the war. U 1233, U 1234 and U 1235 had the round hatch in mid-1944. From this we may surmise that the round hatch was probably added around the late 1943 time period.

Simplified metal hatches - U 187 (launched March 1942), U 190 (launched June 1942) and U 192 (launched July 1942) were all commissioned with simplified grills behind the tower. The cook's hatch had been changed by that point to be metal with bars rather than the older wooden type. This outer hatch was a non-watertight cover, with the real watertight hatch below. Directly ahead of the cook's hatch, the older hatch was replaced with a metal grill which had bars in two sets. The two wooden hatches ahead of the 37mm were replaced on U 187 and U 190 with metal hatches which changed the look of the deck in this area markedly. U 192 did not have any hatch ahead of the 37mm. Instead this boat had a set of bollards orientated to be perpendicular to the length of the boat (as with other IXDs) and slightly farther aft of the previous position. The hatch directly aft of the 37mm on U 192 was the metal type, unlike U 187 and U 190 which was wooden.

The implementation and progression of the metal hatches can be seen in these details of U 187, U 190 and U 192, which were commissioned with the slotted deck and Turm 0 tower. Given that boats being launched in the spring and summer of 1942 had the metal grills, it is true to say that the implementation of the metal grill hatches **preceded** the planked deck by several months. All subsequent boats had these simplified metal grill on the forward and aft deck and boats with the planked deck all had these metal grills.

At the very rear of the wooden area of the aft deck there were large wooden hatches which permitted access to a lifeboat. These wooden hatches were changed to the newer metal grill style and changed the look of the deck in this area. Despite U 190 having some metal grills when commissioned, this boat did not have the newer metal grills over the lifeboat. Later, when U 190 was mostly changed to the planked style of decking, the hatches over the lifeboat became the simplified metal grill style.

IXD foredeck hatch - On the IXDs a watertight hatch was located in the centre of the foredeck behind the capstan.

Part XI - Radar & Radar Warning

Radar and radar warning became a very important aspect of the Battle of the Atlantic and in time became essential for survival. In this section the author will refrain from straying too far into technical and historical aspects and mainly cover only what is directly relevant to modellers.

The implementation of radar aboard U-boats first began in summer 1939, when the IXAs U 39 and U 41 were fitted with a radar set from the Gema manufacturer. It would take until 1942, when air attacks became very dangerous for the U-bootwaffe, before this field of technology was belatedly given the full attention it deserved and introduced to operational U-boats.

The Kriegsmarine used the following codes which will be discussed in this section -

- FuMO (*Funkmessortungsgerät* meaning bearing taking apparatus) - radar equipment
- FuMB (*Funkmessbeobachtergerät* meaning radar warning apparatus) - radar warning receiver equipment
- FuMB Ant - the antenna associated with the FuMB radar warning receiver equipment
- FuMT (*Funkmess-Täuschung* meaning active deception) - anti-radar decoys

It is recommended that readers should refer to *An Illustrated Guide To U-Boat Research* by Simon Morris for the superb drawings of radar and radar warning antennae. A summary table can be found in Part XIV.

Above (88): A frontal view showing the FuMO 29 dipoles and baseplate on an unidentified IXC.

FuMO 29 *Seetakt*

Also known as Gema, from the firm which originally manufactured the set, this surface search radar set consisted of two rows of six diploes fixed to a curved panel above the spray deflector. The upper row of dipoles was for transmitting and the lower row was for receiving. There were slight variations between boats but generally there was a round curved bar at the foot of the wind deflector, another curved bar fixed to the front of the top surface of the spray deflector, and a vertical bar on either side of the baseplate. The position at the front of the tower meant that it could only pick up signals from directly ahead of the boat. The sets were reported to be manufactured by firms including Gema, Siemens and Lorenz.

Evidence of FuMO 29 on Type IXs		
Month	**No**	**Yes**
1941		U 156, U 157, U 158
Jan 42		U 156
Apr 42	U 68	
Jun 42		U 509
Jul 42	U 159, U 174	U 156
Aug 42	U 67, U 129, U 160, U 161, U 504	
Sep 42	U 128, U 155	
Oct 42	U 154, U 515	
Nov 42	U 108, U 505, U 506, U 513	U 509
Dec 42	U 130	U 518, U 522
Early 1943		U 534
Feb 43	U 123, U 508	U 514
Apr 43	U 160	
May 43		U 530
Jun 43		U 185, U 188
Jul 43	U 66, U 172	U 509, U 532
Sep 43	U 505, U 516	
Oct 43		U 196
Nov 43	U 107, U 510	
Dec 43	U 537	
Jan 44	U 123	U 518
Feb 44	U 516	
Mar 44	U 539	
Apr 44	U 154, U 550	U 193
Unknown time		U 168, U 183, U 187, U 188, U 195, U 200, U 507, U 510, U 525, U 533, U 539, U 548

Implementation - The FuMO 29 was first tested in autumn 1941 on U 156, U 157 and U 158, with installation upon operational boats beginning in the summer of 1942. The set was typically fitted more often in the larger IXs compared to smaller VIIs due to space requirements. As illustrated in the table on the previous page, implementation was not universal and it is not possible to identify any patterns as to which boats received and did not receive this feature. No Type IXAs have been seen by the author to have the FuMO 29 but realistically only U 43 remained in operational service by 1943. Although no IXBs have been evidenced with this equipment, it remains possible that a few were fitted as such. Modellers should beware that due to operational security the area above the spray deflector was sometimes covered over to hide the FuMO 29 antenna when boats departed or arrived from patrol.

U 156 - U 156 had the FuMO equipment during patrols 2 and 3 (January 1942 to July 1942) and possibly also during the first patrol. Photos taken at an unknown time show U 156 with the baseplate in place but not the dipoles. No baseplate or diploes look evident in the poor quality shots of U 156 in September 1942 during the famous *Laconia* incident.

Removal - The FuMO 29 proved to be ineffective in picking up surface targets. With a coverage of only 10 degrees on either side of the bow, the U-boat had to turn considerably to pick up targets. This unpopular set was replaced by FuMO 30 from early 1943 onwards but was still present on a few boats in late 1943. U 518 retained this feature in January 1944 when fitted with a Turm IV and U 193 even kept the FuMO 29 as late as April 1944. This may possibly be due to the unavailability of the FuMO 30 equipment but we would certainly not expect the FuMO 29 to be retained at such a late time period given that it was unpopular and performed poorly in comparison with later sets.

FuMO 30 *Seetakt*

Introduced in early 1943, the internal equipment for the FuMO 30 set was essentially the same as the FuMO 29. A completely different antenna made the system far more effective than its predecessor and proved useful in terms of detecting aircraft which were becoming an ever greater threat. The FuMO 30 aerial consisted of a rectangular mattress-style antenna housed in a box on the port side of the tower. The aerial was 1.4 metres wide by 1 metre high but an interrogation report (which may not be accurate) suggests that those fitted in Germany were larger than those fitted in France. The antenna had two four-dipole rows on the front side and two antennas similar to a figure of eight on the rear side. This antenna was manually rotatable for the full 360 degrees from the radio room and could be extended or retracted into the radar box on the port side of the tower. It was raised and lowered by compressed air and was frequently found to be unserviceable. When attacked by an incoming aircraft, the aerial needed to be quickly retracted as it was prone to being damaged when diving.

Evidence of radar box on Type IXs		
Month	**No**	**Yes**
Mar 43		U 154
May 43	U 67, U 108, U 513, U 521, U 527	
Jun 43	U 515	U 155, U 510
Jul 43		U 188, U 506
Aug 43		U 172, U 515, U 523, U 536
Sep 43	U 516	U 505
Oct 43	U 177	U 841
Nov 43		U 107, U 801
Jan 44	U 123	

Implementation - It would appear from the table on the previous page that FuMO 30 replaced FuMO 29 in early 1943 but some sources state that implementation began in late 1942. U 155 and U 510 both had the new set in June 1943 while U 515 was fitted in the refit between June and August 1943. U 516 did not have the set by September 1943 but it is presumed the set was fitted before leaving on the next patrol in October 1943. The IXB U 123 did not have the new set even by January 1944 but the set was fitted to the IXB U 107. U 177 was fitted with the radar box in late 1943 but not with the radar itself.

Replacement - The process of replacing FuMO 30 with FuMO 61 began in March 1944. FuMO 30 was removed from U 801 in January 1944.

Turm arrangement - The radar box was present on the port side of the VIIC test boat U 235 when commissioned in December 1942 but it may have taken another few months before the new set was used operationally. Due to this early time frame U 235 had a Turm 0 tower. Given that Turm II was introduced from December 1942 onwards, it would be much more likely that the FuMO 30 would normally have been added to a Turm II tower. Therefore, adding a radar box to Revell's early war kit is inadvisable unless supported by photographic evidence.

Both sets - U 510 and U 534 both had the unusual combination of the FuMO 29 at the front of the tower plus the radar box on the port side, possibly for comparative test purposes.

FuMO 61 *Hohentweil-U*

Due to the limitations of the set built by Gema, the FuG 200 *Hohentweil* used on Luftwaffe Focke-Wulf Fw200 Condor aircraft was adapted for naval use. The version used on U-boats - FuMO 61 *Hohentweil-U* - replaced the FuMO 30 in 1944. The size of the existing radar box on the port side of the tower restricted how large the mattress could be (1.4 metres wide by 1 metre high). Although this resulted in a compromise in terms of effectiveness, the new set was much more successful in locating aircraft. The antenna for the *Hohentweil-U* was similar to the FuMO 30 in being a rectangular mattress and housed in the same box on the port side. This new antenna and set replaced FuMO 30 from March 1944, with 64 operational boats of Type VII and IX variants being outfitted by September 1944. It was fitted to U 515 between January and March 1944 and was the first Lorient boat to be fitted. U 533 had the set but it was never used by the crew while U 546 used the set without success.

Berta

A trials for apparatus known as *Berta* took place in late 1941. U 172 had what is presumed to be *Berta* in April 1942 during the first operational patrol. Five days into the patrol the front face was torn off due to aircraft attack. The feature was not there during the second patrol beginning in mid-May 1942. If the system had been successful we would expect other boats would have been similarly fitted but this does not appear to be the case. *Berta* is suggested to have the FuMB radar warning designation but is not listed in the radar warning codes.

Right (89): U 172 with *Berta* above the spray deflector.

Radar warning

There are discrepancies between the fitting dates of radar warning receivers in various sources. The green headings refer to radar or radar warning sets (internal equipment) whereas the purple headings refer to antennae (external equipment). The names given to the radar warning devices were normally islands though some systems were associated with other names. This is not a comprehensive list of all the sets and antennae, with technical details deliberately omitted. Only the main antennae required for modellers are given but information on the main radar sets used by U-boats are given to provide an understanding of the development of the antenna.

FuMB 1 *Metox* - Although radar had been fitted to British aircraft since November 1940, it only began to appear in large numbers by 1942. By the summer of 1942 airborne radar was a serious threat to U-boats and countermeasures were necessary. On the 26th August 1942, an order was issued to fit radar warning receivers to all U-boats. The first radar warning receiver on U-boats was the R.600 *Metox*, with Metox being the French company based in Paris which first manufactured the set. Officially designated as FuMB 1 *Metox*, the set was trialled in July 1942 and fitted on operational boats beginning in August 1942. By December 1942 the whole fleet had not yet been fitted. In April 1943 U 175 sailed with an improved version, R.600A. By mid-May 1943, BdU began to appreciate that Allied aircraft were homing in on emissions radiated by the *Metox* equipment itself and banned use of the *Metox* in August 1943.

FuMB Ant 2 *Honduras* antenna - The Honduras antenna (more often referred to as Biscay Cross - *Biskayakreuz* – antenna, or "Southern Cross" in interrogation reports) for the FuMB 1 *Metox* radar warning receiver was an improvised structure made of wood and wire. It was mounted on a bracket on the attack periscope base, and brought into the boat every time the boat dived. This antenna proved effective but due to its rudimentary nature and the requirement to be moved in and out of the boat, it was prone to breakage. The Biscay Cross was used on U-boats from August 1942. It was still carried on board when its replacement - *Bali* (*runddipol*) - was implemented in spring 1943. The Biscay Cross was still kept on board for a long time as a spare in case the *runddipol* did not function. It was no longer carried on board U 66 by January 1944.

Above (90): The diamond-shaped wood and wire Biscay cross on U 123 in March 1943.

Below (91): The *Bali runddipol* on U 181 at the top of periscope housing between periscopes. Some *runddipols* had one dipole while others had two dipoles.

FuMB Ant 3 *Bali 1* antenna - The antenna for FuMB 8 *Wanze G1* and subsequent systems was the FuMB Ant 3 *Bali runddipol* (round dipole). This consisted of a cylinder enclosed in a wire mesh frame, with two dipoles pointing vertically out of the top. Known as the "wire basket" in interrogation reports, the cable went through the stand and entered the pressure hull. The *Bali runddipol* was pressure-tight and overcame the shortcomings of the previous antennae which had to be taken into the boat when diving. The *runddipol* antenna did not allow any direction finding capability.

The order to fit the *runddipol* was issued on the 13th March 1943 but it would take a short time before fleet-wide implementation. It was not present on U 528 and the VIIC U 752 in April 1943. The *runddipol* was present on the following boats: U 175 in April 1943; U 527 and the VIICs U 409 and U 558 in May 1943; U 185 and the VIICs U 615 and U 662 in June 1943; U

506 in July 1943; and U 523 and U 536 in August 1943. From this information we can be reasonably confident that implementation of *Bali* occurred in the spring of 1943. Boats would additionally carry a Biscay Cross inside the boat.

There were two slightly different sizes: FuMB Ant 3 *Bali I* and FuMB Ant 14 *Bali II*. The typical position was on the port side of the bulwark top but there were exceptions in the late war period. It was positioned on the starboard side of U 550 and on a pole in the centre of the periscope housing on U 858, U 889 and U 1232 in 1945. When boats were fitted with the *schnorchel*, the *Bali runddipol* antenna was fitted on the tower as well as the top of the *schnorchel*.

FuMB 4 *Samos* - FuMB 4 *Samos* replaced FuMB 1 *Metox* from late 1943 but was soon banned due to radiated emissions. *Samos* used the FuMB Ant 5 *Samoa* antenna and FuMB Ant 4 *Sumatra* antenna.

FuMB Ant 5 *Samoa* antenna - The *Samoa* antenna consisted of two figure-of-eights and was mounted on the rear of the FuMO 30 radar mattress from late 1943.

FuMB 7 *Naxos* - An RAF Stirling bomber, fitted with the latest new ASV Mark III radar, was shot down near Rotterdam in February 1943. This radar set was analysed first by the Luftwaffe and later by the Kriegsmarine. The capture of this cutting edge technology was significant as it allowed the German scientists to analyse and copy the magnetron. These evaluations made it possible to design a radar warning receiver - the *Naxos* - which detected the ASV Mark III radar and did not radiate emissions. The *Naxos* prototype was available in June 1943 and was introduced to the fleet in early October 1943. *Naxos* initially used the FuMB Ant 3 *Bali* antenna but used the FuMB Ant 11 *Finger* antenna or FuMB Ant 24 *Cuba 1 Fliege* at a later period. It is reported that *Naxos* was delayed due to the manufacturing company Hagenuk being destroyed by aircraft bombs.

FuMB 8 *Zypern I* (*Wanze G1*) - Due to an urgent requirement to replace the *Metox*, a new radar warning receiver known as *Wanze* was rushed into use in August 1943. The official designation was FuMB 8 *Zypern I* (Cyprus) but was often referred to as *Wanze* (or *Wanz*) which was a contraction of *Wellenanzeiger* meaning wave indicator. It was also known as *Hagenuk* after the company manufacturing the unit at Kiel. U 523 was one of the first to be fitted and departed on patrol on the 1st August 1943. Due the immediacy with which *Wanze G1* was introduced, inevitably corners were cut during the design and evaluation process. In due course it became realised that this set also radiated emissions. The *Wanze G1* was banned on the 5th November 1943 and replaced with the *Wanze G2*.

Wanze would normally use the *Bali runddipol* antenna but it could be connected to the Biscay Cross if required. The *Wanze G1* was prone to overheating. In such circumstances, it would be temporarily disconnected until it cooled down, and the *Borkum* set would be connected to the *Bali* antenna.

FuMB 9 *Zypern II* (*Wanze G2*) - Following the order on the 5th November 1943 to cease using *Wanze G1*, a newer version (*Wanze G2*) which did not radiate was ordered. This was introduced in late November 1943.

FuMB 10 *Borkum* - The FuMB 10 *Borkum* set was a primitive stop gap measure that was introduced just after *Wanze G1* was discontinued. The original intention was that *Borkum* was only to be used until the advent of *Wanze G2*. However, the frequency coverage of *Borkum* resulted in it being used in conjunction with *Wanze G2* and the *Naxos* system. *Wanze* covered the 120 to 180 cm range, *Borkum* covered the 75 cm to 3 metre range, and *Naxos* covered the 8 to 12 cm range (including the all-important 9.7 cm wavelength of the ASV Mark III radar). Although only intended as a temporary measure, the fact that the *Wanze*/*Naxos*/*Borkum* combination allowed a near

complete coverage of the radar spectrum meant that all three were used together on many boats until the end of the war. *Borkum* used the FuMB Ant 3 *Bali 1* antenna and was introduced in November 1943.

FuMB Ant 11 *Finger* antenna - Since direction-finding could not be achieved with the *Bali* antenna, *Naxos* also frequently used the FuMB Ant 11 *Finger* antenna. This consisted of a narrow vertical wooden mast with a circular disc at the top, from which a 9 cm metal rod extended out of the top. Since this antenna was liable to breakage, especially when moved quickly inside the tower when the boat dived, spare aerials were often carried. The *Finger* antenna was usually mounted temporarily between the periscopes. Among the boats which used this antenna were U 66, U 515 and U 845. The *Finger* antenna was introduced in October 1943 and was used with the *Naxos* set.

FuMB Ant 24 *Cuba 1 Fliege* antenna - Although the official designation was named after the island of Cuba, this antenna which covered the 8-12 cm wavelength was known as *Fliege* meaning fly. The antenna included a parabolic reflector but had a major problem in that it was not pressure tight and had to be taken below. Modellers should beware that this means the antenna would not normally be universally present on the tower. It was initially added inside the circular direction-finding loop and crewman would have to remove it quickly if an enemy aircraft was spotted. It could also be mounted on a wooden rod between the periscopes but the position was dictated by the preference of the commander. The VIIC U 406 carried *Fliege* in January 1944 for testing purposes along with a civilian radar warning specialist. *Fliege* began to be used operationally in February 1944. It was fitted on U 515 between January and March 1944 and fitted on U 856 in February 1944. The antenna was not yet present on U 801 in February 1944 but was present on U 68 in March 1944 and present on U 860 and the VIIC U 960 in April 1944.

FuMB Ant 25 *Cuba II Mücke* antenna - The second version of *Cuba* was known as *Mücke* meaning mosquito. It had a distinctive funnel shape and was used for picking up the American 3 cm radar. Crews had to rotate the antenna by hand. It was presumably not pressure tight and had to be taken below. The antenna was introduced before June 1944.

FuMB 26 *Tunis* - *Tunis* combined the *Naxos* radar with the *Fliege* and *Mücke* antennae. It could be mounted back to back on a pole on the tower or inside the circular direction-finding loop. The antenna also had to be rotated by hand and taken below when the boat dived. The *Tunis* combination was introduced in May 1944. It was new on U 1229 in August 1944, present on U 877 in November 1944, and present on U 534 and U 889 in May 1945. The towers of U-boats would often have the combination of *Mücke* and *Fliege* but also the *Bali runddipol* until the end of the war.

Above (92): The FuMB 26 *Tunis* combination, which was recovered from the wreck of U 534 and is currently on display in Liverpool. The horn shape is *Mücke* and the curved shape on the other side is *Fliege*.

FuMB 28 *Naxos ZM4* - A development of the FuMB 7 *Naxos*, this set was introduced in August 1944 and is reported to have been used on U 889.

FuMB 35 *Athos* - Introduced in early 1945, the FuMB 35 *Athos* set was present on U 249 and XXIs but does not appear to have been used on IXs.

FuMB 37 *Leros* - *Leros* was used exclusively on Type XXIs.

Anti-radar decoys

FuMT 1 *Aphrodite* - Code-named *Aphrodite*, and known as R.D.B. (radar decoy balloons) in the interrogation reports, this anti-radar decoy consisted of a 36-inch diameter hydrogen-filled balloon which was tethered by a line to a sheet anchor. Once suspended, three aluminium foils of four metre length were attached to the line by a cross-bar. This would act as a radar reflector and create false radar echoes. Initially, the decoys were meant to be inflated on the deck using one of the two hydrogen cylinders on the tower bulwark. The hydrogen cylinder tanks could be seen on a few U-boats, for example the Turm II-equipped U 505 in 1943 had a cylinder on either side of the tower, just behind the end of the periscope housing. Later, two pressure-tight containers were introduced on the tower to safely house four hydrogen bottles. When U 505 was captured in June 1944, the IXC had six cylinders stored under the lower platform floor.

Aphrodite was first fitted to U 185 in May 1943 before the boat sailed in a test capacity in June of 1943 in a test capacity. The VIIC U 615 also had the feature in June 1943. It was fitted to U-boats in spring 1943 and deployed operationally in August of 1943. *Aphrodite* was very commonly used by U-boats but not all boats carried this system, for example it did not feature on board U 257 in January 1944 and U 358 in February 1944.

FuMT 2 *Thesis II C* - *Thesis* included a variety of floating decoys that were intended to confuse Allied radar operators. The feature consisted of thin metal dipoles added to the top of a five metre long wooden pole. At the top of the decoy buoy was a thin wire filled with foil bands. This equipment took up a lot of space under the deck casing and proved awkward to assemble on a rolling deck. It is known as R.D.S. (radar decoy spar buoys) in the interrogation reports.

First introduced in the autumn of 1943, *Thesis* continued to the spring of 1944. It was discontinued around this time when it was recognised that Allied radar sets were not picking up the decoys. Boats which carried *Thesis* include U 801 in November 1943, U 66 in January 1944 and U 860 in April 1944. It was not used on U 515 in March 1944 and U 1229 in August 1944.

FuMT 4 *Thesis US* - This later version of *Thesis* was launched underwater through the *Bold* ejector but not used operationally.

Part XII - Later Tower Arrangements & Armament

The tower arrangements and anti-aircraft armament changed greatly in the mid-war period in response to the increased threat from Allied aircraft, which was particularly severe when transiting through the Bay of Biscay. The towers on Type VIIs and IXs became very different in the late war years compared to the Happy Times early in the war. Boats such as U 505 would have three different versions of the tower (Turm 0, Turm II and Turm IV) within three years of service. This section will discuss the tower arrangements as well as the differences between IXDs and earlier sub-variants in respect to the mid-to-late war towers.

Tower versions

Turm nomenclature - When modifications were implemented on existing and new build boats, the nomenclature Bridge Conversion I, Bridge Conversion II etc. was used to refer to the modified or replacement towers. The term “Bridge Conversion I” is better known as “Turm I” (*turm* meaning tower in German). Since Bridge Conversion I came to be known as Turm I, and Bridge Conversion II became known as Turm II, the original towers would later became known as Turm 0.

It has been said that the *wintergarten* refers specifically to the lower platform on a Turm II or Turm IV bridge. This would mean that the upper Flak platform was not the wintergarten - only the lower platform was. Although the rear of the tower on an early Turm 0 tower is sometimes referred

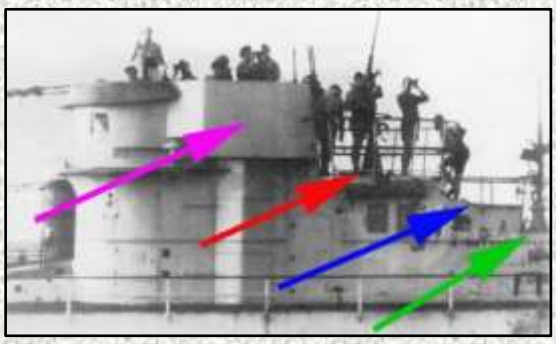
to as the wintergarten, in this article the term will *only* refer to the upper platform and lower platform.

The term *Turm* is not specific to a U-boat variant; rather it is the *style* of tower that was fitted to different variants. For example, a Type VIIC and a Type IXC might both be equipped with a Turm IV tower. Although the towers would be outfitted with the same armament and the same platform arrangements, the difference in size between the variants means that the actual towers themselves would be slightly different sizes and have diverse railing arrangements.

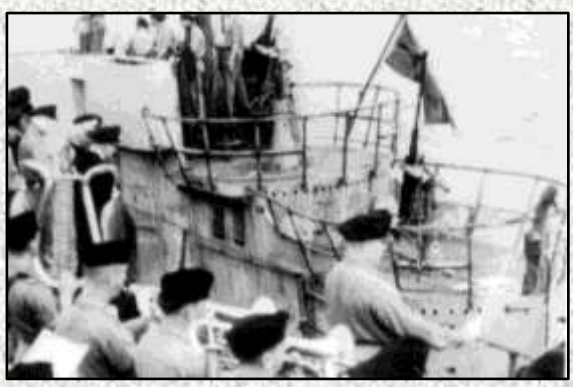
Turm 0 - As previously discussed, the original towers fitted to all U-boats in the early war period would come to be known as Turm 0. This simple tower arrangement had a single 20mm C/30 anti-aircraft weapon behind the bridge and no lower wintergarten platform. This was the tower arrangement on all Type IXs up until the end of 1942 and features on Revell's early war IXC model kit (05166).

Turm I - The first bridge conversion of the original tower - Turm I - was used on only a very few U-boats. In the Type IX fleet this may only have consisted of U 193 at the end of 1942. It was intended to mount two 20mm MG 151 guns on a widened upper platform and a twin 20mm C/30 on a lower wintergarten platform. Since the twin 20mm was not yet ready, a single 20mm C/30 was mounted on the lower platform. Due to poor performance, and the positive results of the *Vierling*, which was being developed and tested at the time, Turm I was abandoned at the end of 1942.

Turm II - Bridge Conversion II (known as Turm II) was used on many Type VIIs and IXs. The Turm 0 towers began to be modified to Turm II in December 1942. Turm II featured a single 20mm C/38 on the upper platform behind the bridge and a single 20mm C/38 on a lower wintergarten platform. Note that the C/38 was an improvement upon the earlier C/30 gun. U 504 was fitted with a Turm II in July 1943 with a twin 20mm on both platforms but this was an exception to the norm. Turm II began to be replaced by Turm IV from spring 1943 but it took time to make this significant modification to the entire fleet.



Left (93): U 172 with Turm II in August 1943. The purple arrow points to the radar box, red to the upper platform and green to the lower platform. The blue arrow points to an area at the front of the lower platform in which the sides of the hull were raised to mid-level. These raised sides did not feature on Turm IIs on VIICs.



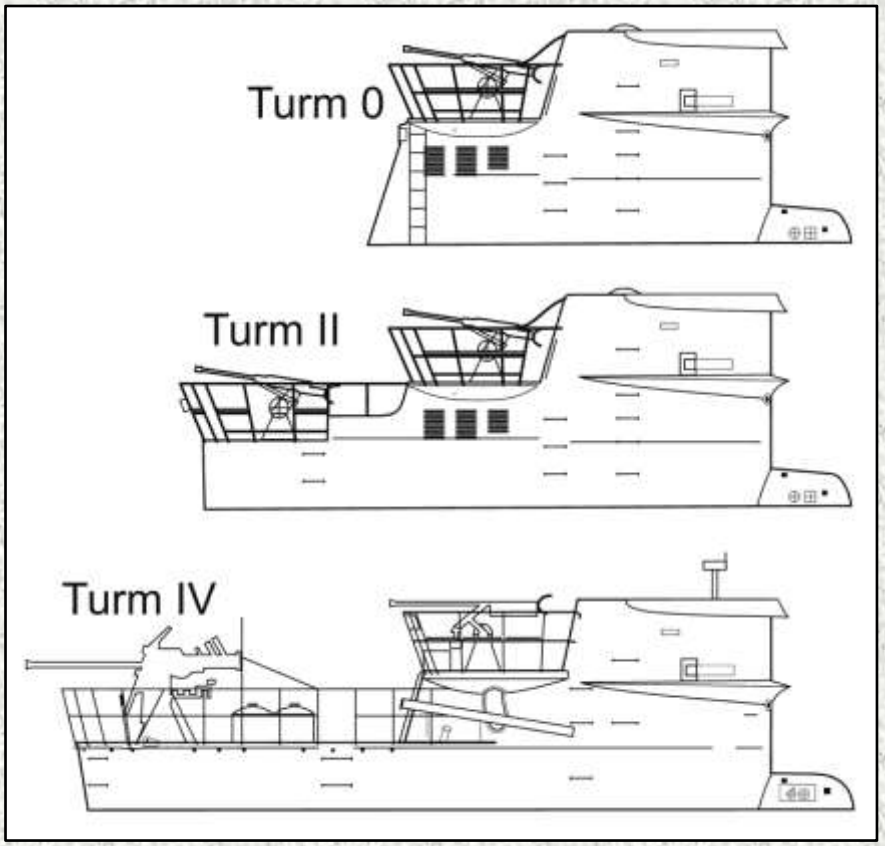
Right (94): The railing arrangements can be seen in this image of U 510 at Lorient in August 1943. The Turm II retained the air intake grills at the side of the tower but this was discontinued with Turm IV towers.

A Turm II boat requires significant alterations to Revell's early war IXC model kit. Such a conversion would require the modeller to build a radar box which was present on the port side of a Turm II tower.

Turm III - The intention with Turm III was to have a pair of single 20mms side by side on the upper platform and no lower platform. This was necessary for VIIDs so that the mineshafts would not be covered. Only a few boats (perhaps only VIIDs?) were outfitted in this fashion in April and May 1943. However, the initial intentions may have changed because late in the war the VIID U 218 had an upper platform as well as a lower, shortened lower platform which covered some of the mineshafts. This tower arrangement is not applicable to Type IXs.

Monsun platform - According to page 25 of *Vom Original zum Modell: Uboottyp IXC* by Köhl and Niestle, the prefabricated Turm II towers had not arrived in sufficient numbers in Lorient. As a temporary measure due to the anti-aircraft threat, a second 20mm gun was added in a round platform on the aft deck, with a catwalk on a decreasing angle down to the rear platform. This platform was added to the Monsun boats U 168, U 183 and U 509 prior to their departure in July 1943. The boats sailed to Penang and served in the Indian Ocean, except U 509 which was sunk en route. The platform necessitated the removal of the 37mm on the aft deck but the 105mm deck gun on the foredeck was retained.

Note: Some source refer to the Monsun platform as Turm III but this designation appears to be incorrect.



Above (95): To distinguish between a Turm II and Turm IV, we need to look at the upper platform. If there is only one gun then it is a Turm II but two separate gun mounts means it is a Turm IV.

Turm IV - Turm II was only an intermediate solution until suitable armament was available. It had been decided on the 14th November 1942 that it would desirable to have a Turm IV arrangement consisting of a pair of twin 20mm C/38s (mounted side by side) on the upper platform, and either a quadruple 20mm (*Vierling*) or 37mm automatic on the lower platform. None of these weapons were available so boats had to make do in the meantime with Turm II towers. The Turm IV towers were ordered on the 14th November 1942 but it was not until the spring of 1943 before the towers were changed to Turm IV standard. The change from Turm II to Turm IV (as with Turm 0 to Turm II) was one of the most major alterations made to the U-boat fleet. During this extensive refit, a pre-fabricated section with the upper and lower platform was added to the existing forward section of the tower. This created a mix of old tower at the front and new prefabricated platforms at the rear. As covered later, the 37mm automatic was not available when the Turm IV towers were first installed, so Vierlings were fitted initially if they were available.

Type IX tower arrangements				
Time period	**Turm 0**	**Turm II**	**Turm IV**	**Monsoon**
Nov 42	U 66, U 108, U 164, U 192, U 505, U 509, U 517			
Dec 42	U 160, U 518, U 522			
Jan 43	U 177, U 187, U 510	U 66, U 194, U 847		
Feb 43	U 125, U 130	U 841, U 538		
Mar 43	U 105, U 524	U 539, U 540, U 541, U 801, U 842		
Apr 43	U 128, U 172	U 177, U 528, U 542, U 543, U 844		
May 43	U 108, U 185, U 199, U 509, U 513	U 505, U 508, U 523, U 527, U 532, U 544, U 846, U 851, U 864		
Jun 43	U 515	U 185, U 853		
Jul 43	U 154, U 187	U 188, U 504, U 505, U 506, U 533, U 854, U 859	U 801, U 841	U 168, U 183, U 509
Aug 43		U 172, U 510, U 515, U 856	U 536, U 544	
Sep 43		U 66, U 857		
Oct 43		U 177	U 865	
Nov 43			U 510, U 546, U 866, U 1225, U 1226	U 168, U 509
Dec 43		U 864	U 177, U 804, U 867, U 1227, U 1228	
Jan 44			U 518, U 869, U 871, U 1229, U 1230	
Feb 44			U 856, U 870, U 872, U 1231	
Mar 44			U 68, U 515, U 1232, U 1233	
Apr 44			U 550, U 806, U 860, U 1234	
May 44			U 1235	
Mid 44				U 183

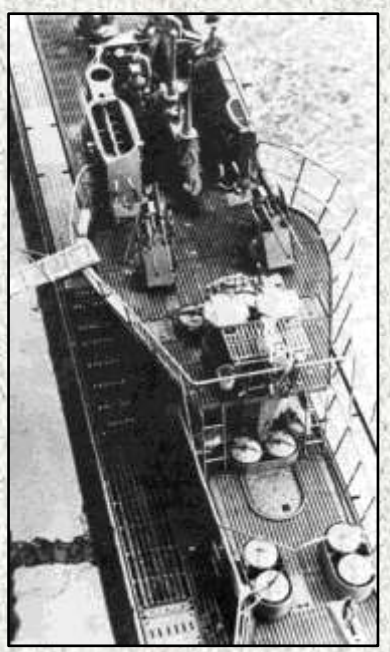
Turm II implementation - The table on the previous page shows the time frame of tower arrangements with clear overlaps when more than one style of towers was present in the U-boat fleet. Turm II was introduced in December 1942 and we can see a few IXs with this tower sailing on operational patrols in January 1943. From interrogation reports it is known that the following boats were fitted in the following time periods: U 66 in late 1942, U 177 from January to April 1943, U 185 in May 1943 and U 515 in August 1943. The table shows that Turm 0 was phased out by summer 1943.

Right (96): U 505 under cover in Chicago with a Turm IV tower which replaced the boat's Turm II.

Turm IV implementation - From the table we can see that boats were sailing on operational patrols in July 1943 following the introduction of this style in spring 1943. From interrogation reports it is known that the following boats were fitted in the following time periods: U 544 from May to August 1943, U 801 in July 1943, U 177 in late 1943, and U 515 and U 856 in February 1944. U 1225 was commissioned in November 1943 with the Turm IV, as were all the subsequent boats in the batch. The table also shows that Turm II was phased out towards the end of 1943.

Type IXD Turm IV - The IXDs were 14% longer than the earlier sub-variants and required a noticeably longer tower. In particular the upper platform was much longer than the typical Turm IVs on VIICs and IXCs. The size of the upper platform may arguably have resulted from the pressure proof containers housing the parts for the *Bachstelze* observation helicopter. At the rear of the upper platform was a straight edge, behind which were two ladders down to the lower platform. The front section of the lower platform was straight-sided and consisted of a cook's access hatch to allow crewmen to quickly get below when under air attack and waterproof ammunition containers at the front, starboard side and port side.

Right (97): U 862 with the larger version of Turm IV fitted to IXD2s. The twin 20mms on the upper platform have shields to protect the crew, with the pressure proof containers for the *Bachstelze* in the central position behind. U 862 had three separate double ammunition containers, each of which were encased within oval boxes.



Turm IV armament

The magazine *U-Boot Im Focus 9* contains a superb discussion of the changes to the anti-aircraft armament in the U-bootwaffe. For more details readers are directed to this highly informative issue of the magazine. The *U-Boot Im Focus 9* article provides us with the following information (the text in italics and square brackets is from the author) -

- Vierlings were first ready for experimental purposes in March 1943, and fitted to boats in April and May 1943.
- In the April and May 1943 period, the second boat was due to have been fitted with a 37mm

automatic but this was not yet ready.

- Production of the Turm IV with Vierling was increased in mid-May 1943; 50 Turm IVs were due to have been delivered in June 1943, and 150 in July 1943 *[it is unclear if these numbers were actually delivered]*.
- Conversion to Turm IV and Vierling began in early June 1943, with operational boats getting first opportunity.
- On the 14th June 1943 an order was issued stating that no U-boats should leave from Atlantic ports without twin 20mms. Since Vierlings were mandatory for Atlantic boats at this point, this effectively meant that a Turm IV was mandatory as of mid-June 1943. *[This is earlier than August 1943, the period when others books state that boat were not allowed to go on operations without a Turm IV tower]*
- As a direct result of the June 1943 order, U-boats were delayed from sailing on war patrols in the late June / early July 1943 period.
- Boats operating on a war patrol without a Vierling were actually recalled to Norwegian ports.
- The effectiveness of the Vierling was betrayed by its lack of range. It was to be replaced by the 37mm automatic when the longer range, larger calibre weapon became available.

The decision to recall boats from patrols if they did not have the Vierling seems, at first, quite drastic. However, this decision becomes comprehensible when we recognise that it was made in the period directly following Black May. During the infamous month of May 1943, at least 40 U-boats were sunk. The events of that infamous month resulted in BdU withdrawing almost all boats to port. Tactical and technological changes were implemented to try to wrench the upper hand back from the Allies, though this ultimately proved to be impossible.

Change from Vierling to 37mm automatic

The U-boat version of the Vierling was essentially the same as the land model except for the mounting. The weapon was unsatisfactory as it was considered too complicated, too bulky and unreliable in a sea environment. When the Vierling did not rise to expectations, this four-barrelled weapon was changed to a single 37mm fully automatic weapon (3.7cm M 42U gun on LM 42U mount). This automatic weapon, fitted on the lower wintergarten platform, should not be confused with the 37mm semi-automatic which had previously been present on the aft deck.

The new fully automatic weapon had a greater range than the Vierling and proved to be much more effective. The 37mm on the lower platform, and the twin 20mms on the upper platform, became the standard fit for IXs, VIICs and VIIC/41s until the end of the war.

According to Eberhard Rössler in *The U-Boat: The Evolution And Technical History Of German Submarines*, the 37mm automatic was ordered on the 15th October 1943. In Robert C. Stern's *Type VII U-Boats*, the author asserts that that the 37mm automatic "finally began" to be fitted in November 1943, with 18 boats being fitted by the start of December.

The interrogation report of U 177 states that the "37 mm full-automatic gun was introduced to the U-boat arm about November 1943". U 177 had returned from its penultimate patrol on the 1st October 1943. At that time, a pair of twin 20mms were added to the upper platform, but it was necessary to add a *Vierling* to the lower platform

Right (98): The four-barrelled Vierling during the commissioning ceremony of U 869 on the 26th January 1944.

of U 177 because a 37mm was not available. The reports states: “The 37 mm. gun could not be procured until the last days before sailing and a quadruple 20 mm. gun was mounted for use in gunnery exercises.” The 37mm was fitted in a three day period in La Pallice, just after the middle of December 1943, and the boat sailed on its final patrol on the second day of 1944.

U 515 - On U 515 a pair of twin 20mm C/38s was mounted side by side on the upper platform and a twin 20mm C/38 was mounted on the lower platform. The reason for this non-standard combination is likely due to the lack of availability of the Vierling and 37mm automatic.

Turm IV tower armament			
Time period	**Vierling**	**37mm single**	**37mm twin**
May 43	U 564, U 758 (VIICs)		
Jul 43	U 801, U 841		
Aug 43	U 523, U 536		
Sep 43	U 848		
Oct 43	U 841, U 865		
Nov 43	U 172, U 177, U 866, U 1225	U 510, U 546	
Dec 43	U 804, U 860, U 867	U 177	
Jan 44	U 154, U 801, U 869	U 66	
Feb 44	U 516, U 870	U 515, U 801, U 860	
Mar 44		U 68, U 877, U 1232	
Apr 44		U 806	
May 44	U 1228	U 170	
Jun 44		U 858, U 1228	
Jul 44		U 1229	
Nov 44			U 877
Mar 45		U 546	
May 45		U 533, U 805, U 858	U 190, U 534, U 873, U 889

Vierling implementation - As discussed previously, the Vierling was first fitted for experimental purposes in March 1943 and began to be first fitted in spring 1943. It is assumed that many were added to the lower platforms in the summer of 1943 as they became available from the manufacturer. An example is U 801, which was fitted with a Vierling in July 1943. As can be seen from the table above, the Vierling was present until early 1944. U 1228 appears to have kept her Vierling until May 1944, probably due to the lack of availability of the 37mm automatic.

37mm automatic implementation - When U-boats were sunk, the Allies would interrogate any survivors. Many of the interrogation reports are available to us (at www.uboatarchive.net) and provide excellent information on technical and operational details. The following information about 37mm automatic fitting dates can be gleamed from these interrogation reports -

- U 546 - November 1943
- U 177 - mid-December 1943
- U 845 - end of 1943
- U 68 - after late December 1943
- U 515 - after mid-January 1944
- U 801 and U 860 - February 1944
- U 515 - January to March 1944
- U 1228 - June 1944
- U 1229 - July 1944

The information in the tables and interrogation reports support the hypothesis that the 37mm automatic began to be fitted in November 1943. Clearly it took many months for the weapon to be fitted to the whole fleet, with the new boats such as U 1228 and U 1229 which had not yet sailed on a war patrol being fitted in the summer of 1944.

Twin 37mm automatic - It was preferential to have as much firepower as possible to fight against attacking Allied aircraft. Initially a twin 37mm automatic was thought to be too bulky for use on U-boats but its increased firepower resulted in it replacing the single 37mm automatic on the lower platform of some boats by the end of the war. Due to its size it was better suited to the larger IXs but it was also fitted to some VIICs and VIIC/41s. According to Jon Kelly, U 534 had a 3.7cm Zwilling M 42 U gun on a DLM 42 U mount, which was upgraded to a 3.7cm Zwilling M 43 U gun on a DLM 42 U mount. The twin 37mm automatic was fitted to U 870 in late 1944 and to U 877 prior to November 1944. It is thought that this weapon was fitted to U-boats in late 1944 and early 1945 but implementation was not universal by the end of the war. In May 1945 U 533, U 805 and U 858 did not have the twin 37mm but U 190, U 534, U 873 and U 889 were fitted with this powerful weapon.

Machine guns - Late war photos tend not to show small machine guns in place on the tower. By that stage of the war U-boats were going on patrol with increased anti-aircraft armament to attempt to combat the greatly increased threat from the air. It may be that small calibre guns were considered irrelevant when compared to the punch that the four 20mm barrels on a Vierling or a 37mm could provide.

Above left (99): The twin 20mms on the upper platform of U 505.

Above right (100): The single 37mm automatic on the lower platform of U 505.

Turm II railings on IXBs and IXCs

Note: In the following sections vertical 2 refers to the second vertical stanchion from the front on the side being discussed. Port and starboard sides will be discussed separately where necessary.

The following points are relevant to Turm IIs -

- Intake grills were present on the sides of all Turm II towers.
- Grip bars were present on the sides of the tower below the platforms.
- No ladders were present from the lower to upper platform on IXBs and IXCs.
- Four grip bars were present on the vertical face between the upper and lower platforms to allow climbing up and down between platforms.

- Also on the vertical face was a pair of round ammunition hatches (one each outboard of the grip bars).
- The rear jumping wire attachment point was normally on the side of the upper platform just below the floor level but a few boats did have a central post which could form the support for a single aft jumping wire.
- Round drainage holes on the outside of the lower platform near the top.

IXB and IXC upper platform railings

- U 510 - April 1943
- Port side - 5 verticals; 4 wooden seats between verticals 1 and 5.
- Port side - low level horizontal bar between verticals 1 and 5.
- Port side - small gap, no grip bars and no low level horizontal bar between radar box and vertical 1; chain link in between..
- Starboard - 5 verticals; 4 wooden seats between verticals 1 and 5.
- Starboard - low level horizontal bar between verticals 1 and 5.
- Starboard - gap and no low level horizontal bar between tower and vertical 1.
- One vertical at rear of upper platform; there was a gap on either side with no mid-level horizontal bar to allow a crewman to climb between platforms.

- U 857 - September 1943
- Port side - 5 verticals; 4 wooden seats between verticals 1 and 5.
- Port side - low level horizontal bar between verticals 1 and 5.
- Port side - gap and no low level horizontal bar between radar box and vertical 1; chain link in between.
- Vertical grip bar on tower sides and on front of vertical 1 for crewmen to grip onto when climbing from the deck to the upper platform.
- One vertical at rear of upper platform; there was a gap on either side with no mid-level horizontal bar to allow a crewman to climb between platforms.

Note: U 844 had a grip bar on the port side from the radar box curving down to the tower side.

IXB and IXC lower platform railings - The tower sides were raised up to the level of the mid-level up to and including vertical 2. A wooden seat was present on top of this raised section, starting just ahead of vertical 1 and ending at vertical 2 (referred to as raised section below). The wooden seat essentially sat on top of the wooden floor despite it being of no identifiable benefit.

There was an extra vertical support bar from the bottom of vertical 3 at a slightly greater angle than vertical 3. A short plate was present between the top of this vertical bar and the outside of the top horizontal bar on main railings. The jumping wire was attached to the plate and kept the jumping wire slightly wider than would be the case if the extra vertical bar had not been present.

This most common lower platform railing arrangement can be found on U 857.

- U 857 - September 1943
- Both sides - 5 verticals; 2 wooden seats (one on raised section and one between verticals 4 and 5.
- Both sides - low level horizontal bar between verticals 4 and end post.
- Thick vertical post at the rear.
- Mid-level horizontal bar present all the way to the thick vertical post, resulting in no space for crewmen to climb through.
- Rear navigation light was attached on a box to the port side of this thick vertical post, with a power cable running down from the box.

- Vertical grip bar positioned near the bottom of the inside of this rear post (due to very low height the reason for this position is unclear).
- Both sides - insulating conduits on dedicated posts running on outside of tower railings; top attached to vertical 5 and the bottom of post curved into tower sides; a thin wire present from top of each conduit post to aft jumping wires.

Slight differences from U 857 can be found on a few boats -

- U 194, U 504 and U 510 had the navigation light directly behind the thick vertical post at the rear.
- U 172, U 194 and U 510 (but not U 504) had a thick vertical post which was higher than the top of the railings, with a short diagonal at each side from the top of the post to the top railing bars. This was intended as a mount for a single aft jumping wire. U 194 did have a single jumping wire running back from the top of this post. U 510 in April 1943 and U 172 in May 1943 had the traditional two aft jumping wires despite having the thick tall vertical post.
- U 172 had no mid-level horizontal bar between verticals 2 and 3 to allow for crewmen to more easily climb up from the deck into the lower platform.
- U 193, U 846 and U 853 had a cook's hatch at the rear of the lower platform while U 857 had a rectangular metal hatch in this position.

U 534 did not have the thick vertical post at the rear and was arranged as follows -

- U 534 - Early 1943
- Both sides - 6 verticals; 2 wooden seats (one on raised section and one between verticals 4 and 5.
- Low level horizontal bar running between vertical 4 on port side and vertical 4 on starboard side.
- No thick vertical post at the rear.
- Rear navigation light was attached on a box in the centre below the top of the top railings; supported by a horizontal bar set just above mid-level height and two short verticals running from sides of the light to the top horizontal bar; a power cable was present running down from the box.
- Port side - insulating conduits on dedicated post running on outside of tower railings; top attached to vertical 5 and the bottom of post curved into tower sides; a thin wire present from top of each conduit post to port jumping wire.
- Starboard side - insulating conduit on a circle on the underside at the rear of the lower platform (the same style as on the underside of Turm 0 tower platform); a thin wire present from top of this circle to starboard jumping wires.

U 172 also had the circular insulating conduit on the starboard side of the lower platform so this arrangement was not unique to U 534.

Turm II railings on IXDs

IXD upper platform railings - Due to the size of IXDs, the Turm II was very dissimilar to the earlier sub-variants, particularly in relation to the upper railings. On IXDs there was a set of side railings on the port side and another on the starboard side. These side railings each had 5 verticals, with three wooden seats between verticals 2 and 5. A low level horizontal bar was between vertical 2 and 5 and there was a gap between verticals 1 and 2 with no mid-level horizontal bar. There was a ladder from this space diagonally downwards at an angle to the sides of the tower allowing a crewman to climb up from the deck to the upper platform.

The rear of the upper platform was not curved but straight. In the centre was a large set of

bars consisting of four thick horizontals, three thick verticals and 38 thin verticals. In between this centre set of bars and the side railings was a gap on either side permitting access down via a ladder to the lower platform. To help prevent crewmen climbing up or down the ladder from falling overboard, there was an additional set of railings on each side consisting of three horizontal bars plus one diagonal which curved down and met with the top of the top railing bar on the lower railings.

IXD lower platform railings - The lower platform railings were more similar in style to IXCs such as U 857 in having 5 verticals. There were 3 wooden seats per side but not on the raised section. Rather the seats were between verticals 2 and 3, 3 and 4, and vertical 5 and the end post. There was a low level horizontal bar between verticals 4 and the end post. The rear navigation light was attached on a box directly behind the thick vertical end post, with a power cable running down from the box. There were insulating conduits on dedicated posts attached to vertical 5. One difference is that there was a gap between verticals 4 and 5 with no mid-level horizontal bar allowing access for crewmen to climb up from the deck. A ladder was positioned below this gap to facilitate crew movement. As with earlier sub-variants there was a cook's hatch at the rear of the lower platform.

There were differences between the jumping wire arrangements on IXDs. U 851, U 852, U 859 and U 864 all had the traditional twin aft jumping wire arrangement with the extra outboard support bar which kept the wires farther apart. U 850 did not have this outboard support bar and had a single jumping wire from the top of a taller vertical post at the rear. One difference is that U 850 did not have the two small diagonals that were on U 172, U 194 and U 510.

Turm IV railings on IXBs and IXCs

The following points are relevant to Turm IVs -

- Intake grills were not present on Turm IV towers.
- No ladders from the deck to the lower platform.
- Low level horizontal bars were much thinner than on Turm 0 and Turm II.

IXB and IXC upper platform railings

- U 869 - January 1944
- Port side - 6 verticals; 3 wooden seats between verticals 2 and 5.
- Port side - low level thin horizontal bar between verticals 2 and 4; additional two small low level L-shaped bars (behind vertical 4 and ahead of vertical 5).
- Port side - ladder with 4 rungs down at angle down to tower sides between verticals 1 and 2; no mid-level horizontal bar between verticals 1 and 2.
- Port side - grip bars on outside of verticals 1 and 2.
- Starboard side - presumed to be symmetrical to port side.
- Mid-level horizontal bar from vertical 6 on port side to vertical 6 on starboard side; vertical from this mid-level to top; there was a flagpole support consisting of a horizontal out from mid-level and two bars out from the top horizontal bar.
- No vertical grips bars at rear of tower sides.

- U 505 - May 1944
- Port side - 6 verticals; 4 wooden seats between tower and vertical 4.
- Port side - low level thin horizontal bar between tower and vertical 4.
- Port side - no tower rungs and no gap for crewmen to climb up from deck.
- Starboard side - 6 verticals; 3 wooden seats between verticals 1 and 4.
- Starboard side - low level thin horizontal bar between verticals 1 and 4.

- Starboard side - gap between tower and vertical 1; no mid-level horizontal bar and no low level bar; chain link at mid-level to permit crewman climbing up from deck using tower rungs.
- Mid-level horizontal bar from vertical 6 on port side to vertical 6 on starboard side; vertical from this mid-level to top; there was a flagpole support consisting of a horizontal out from mid-level and two bars out from the top horizontal bar.
- No vertical grips bars at rear of tower sides.

Note: The wooden seats on the port side were present during capture and when boat was outside in Chicago but are missing on the contemporary U 505. The starboard wooden seats are still present.

U 190 - May 1945

- Both sides - 6 verticals; 4 wooden seats between verticals 1 and 5.
- No low level thin horizontal bar.
- Mid-level horizontal bar from vertical 6 on port side to vertical 6 on starboard side; vertical from this mid-level to top; there was a flagpole support consisting of a horizontal out from mid-level and two bars out from the top horizontal bar.
- No vertical grips bars at rear of tower sides.

U 805 - May 1945

- Both sides - 5 verticals; 4 wooden seats between tower and vertical 3.
- Both sides - low level thin horizontal bar between tower and vertical 5.
- Plate between floor and low level thin horizontal between verticals 4 and 5 (both sides).
- Mid-level horizontal bar from vertical 5 on port side to vertical 5 on starboard side; vertical from this mid-level to top; there was a flagpole support consisting of a horizontal out from mid-level and two bars out from the top horizontal bar plus an additional vertical which met with outside of the platform base.
- No vertical grips bars at rear of tower sides.

U 889 - May 1945

- Port side - 5 verticals; 3 wooden seats between verticals 1 and 4.
- Port side - low level thin horizontal bar between verticals 1 and 3.
- Starboard side - 6 verticals; 4 wooden seats between verticals 1 and 5.
- Starboard side - low level thin horizontal bar between verticals 1 and 4.
- Mid-level horizontal bar from vertical 6 on port side to vertical 6 on starboard side; vertical from this mid-level to top; there was a flagpole support consisting of a horizontal out from mid-level and two bars out from the top horizontal bar.
- Vertical grips bars present at rear of tower sides even though there was no space for crewman to climb through due to mid-level horizontal bar

There was always no mid-level horizontal bar above the ladders between upper and lower platforms to permit access between platforms.

Some boats had a ladder on the side of the tower up to the upper platform. There was no mid-level horizontal bar so crewmen could climb up from the deck to the upper platform. The boats fitted with this ladder included U 515 plus U 870 in February 1944 and U 880 in May 1944. This feature was not present on boats in 1945 or indeed U 505 in May 1944. It may be the case that the ladder was present on all early Turm IVs and removed in the spring of 1944. The steep angle of the ladder would be a reason for removal. An extra horizontal would be added when it was realised that the crew would no longer be climbing up from the deck.

IXB and IXC lower platform railings - On many Turm IIs there was an extra vertical bar at an angle which kept the jumping wire slightly wider; the wire went from the top of this extra bar to an

attachment point on the sides of the tower. This arrangement was not present on any Turm IVs as the jumping wire began at the top of vertical 8 rather than the tower.

The mesh, overhead railings and extra railings at the very end of the lower platform will be discussed in the next section.

U 869 - January 1944

- Both sides - 11 verticals with no wooden seats.
- Both sides - curve on platform starts around vertical 5.
- Both sides - one low level thin horizontal bar from vertical 5 on port side all the way around the vertical 5 on the starboard side.
- Both sides - gap between verticals 3 and 4 with no mid-level horizontal bar and two grips below.
- Both sides - diagonals on either side of vertical 8.
- Both sides - insulating conduit bar positioned outboard of vertical 9; was closer to tower railings.
- Central vertical at rear (making 23 verticals in total).
- Rear navigation light on back of central vertical.
- No thin bar around the lower platform (near to the top).
- No round drainage holes around lower platform (near to the top).

U 505 - May 1944

- Both sides - 11 verticals with no wooden seats.
- Both sides - curve on platform starts around vertical 5.
- Both sides - no low level thin horizontal bar.
- Port side - gap between verticals 2 and 3 with no mid-level horizontal bar; two grips below on tower side to allow crewmen to climb up and down from deck.
- Starboard side - gap between verticals 3 and 4 with no mid-level horizontal bar and two grips below.
- Both sides - diagonals on either side of vertical 8.
- Both sides - insulating conduit bar positioned outboard of vertical 9.
- Central vertical at rear (making 23 verticals in total).
- Rear navigation light on back of central vertical.
- Thin bar around the lower platform (near to the top).
- Round drainage holes around lower platform (near to the top).

U 190 - May 1945

- Both sides - 11 verticals with no wooden seats.
- Both sides - curve on platform starts around vertical 5.
- Both sides - no low level thin horizontal bar due to mesh.
- Port side - gap between verticals 3 and 4 with no mid-level horizontal bar and two grips below.
- Starboard side - gap between verticals 2 and 3 with no mid-level horizontal bar and two grips below.
- Both sides - diagonals on either side of vertical 8.
- Port side - insulating conduit bar positioned outboard of vertical 8 with bottom of bar entering a round drainage hole ahead of vertical 8.
- Starboard side - insulating conduit bar positioned outboard of vertical 10 with bottom of bar entering a round drainage hole ahead of vertical 10.
- Central vertical at rear (making 23 verticals in total).
- Rear navigation light on back of central vertical; cable ran downwards into one of the drainage holes offset to port.

- Thin bar around the lower platform (near to the top).
- Round drainage holes around lower platform (near to the top).

⌖ U 805 - May 1945

- Both sides - 10 verticals with no wooden seats.
- Both sides - instead of vertical 2 there were two diagonals; one from near the bottom of vertical in position 1 to the top bar; one from neat the bottom of vertical in position 3 to the top bar.
- Both sides - curve on platform starts around the vertical in position 5.
- Both sides - no low level horizontal bars due to mesh (discussed later).
- Both sides - gap between verticals in positions 3 and 4 (actually the second and third verticals on U 805).
- Both sides - diagonals on either side of vertical in position 8.
- Both sides - insulating conduit bar positioned outboard of vertical in position 11.
- Central vertical at rear (making 21 verticals in total).
- Rear navigation light on back of central vertical.
- No thin bar around the lower platform (near to the top).
- No round drainage holes around lower platform (near to the top).

Note: For U 805 above, even though vertical 2 is missing we will refer to the vertical numbers in their normal positions. Therefore the jumping wires on vertical 8 above is actually the seventh vertical back on U 805 but is in position for vertical 8 on other boats.

⌖ U 889 - May 1945

- Both sides - 11 verticals with no wooden seats.
- Both sides - curve on platform starts around vertical 5.
- Both sides - 2 low level **very** thin horizontal bars from vertical 5 on port side all the way around the vertical 5 on the starboard side. One very thin bar was on the outside of the verticals and the other on the inside.
- Both sides - gap between verticals 3 and 4 with no mid-level horizontal bar and two grips below.
- Both sides - diagonals on either side of vertical 8.
- Both sides - insulating conduit bar positioned outboard of vertical 10.
- Both sides - gap between verticals 10 and 11 with no mid-level horizontal bar and two grips below.
- Central vertical at rear (making 23 verticals in total).
- Rear navigation light on back of central vertical.
- No thin bar around the lower platform (near to the top).
- No round drainage holes around lower platform (near to the top).

Turm IV railings on IXDs

IXD upper platform railings - The IXDs had a much longer upper platform with the rear being a straight edge. There were 16 verticals in total rather than 10 or 12 with IXCs.

⌖ U 862 - 1944

- Both sides - 7 verticals; 4 wooden seats between verticals 1 and 5.
- Both sides - low level thin horizontal bar between verticals 1 and 5.
- Straight rear area - 2 verticals.
- Behind upper platform - one bar near the end of the top bar on the port side back to the lower tower railings; same on starboard side.
- No vertical grips bars at rear of tower sides.

IXD lower platform railings - There were 25 verticals on IXDs rather than the 23 on IXCs.

- U 181 - 1944
- Both sides - 12 verticals with no wooden seats.
- Both sides - curve on platform starts around vertical 5.
- Both sides - low level thin horizontal bars with mesh.
- Both sides - gap between verticals 3 and 4 with no mid-level horizontal bar and two grips below.
- Both sides - insulating conduit bar positioned outboard of vertical 8.
- Both sides - diagonals on either side of vertical 9.
- Both sides - extra bars on vertical 9 to keep the jumping wires farther outboard.
- Central vertical at rear (making 25 verticals in total).
- Rear navigation light on back of central vertical; cable ran downwards and entered lower platform slightly offset to port.
- No thin bar around the lower platform (near to the top).
- Three levels of oval drainage holes around lower platform; one level near top and two levels near bottom.

U 873 did not have the oval drainage holes around the lower platform and also had no mesh.

Other Turm IV railing features

Extra railing bars on lower platform railings - The VIICs and IXs at the end of the war had an extra set of railing bars on top of the end of the lower platform on Turm IVs. The style varied as follows -

- one horizontal level, 3 short verticals (1H/3V)
- one horizontal level, 4 short verticals (1H/4V)
- two horizontal levels, 4 short verticals (2H/4V)
- two horizontal levels, 7 short verticals (2H/7V)

Extra bar at rear of lower platform railings on Type IXs						
Month	**No**	**1H/3V**	**1H/4V**	**2H/4V**	**2H/7V**	**Unknown style**
Nov 43	U 866					
Dec 43	U 864, U 867, U 868					
Jan 44	U 869					
Feb 44	U 870				U 843	U 170
Apr 44					U 879	
May 44		U 505				
Aug 44					U 547	
1944		U 181				
May 1945			U 190	U 861	U 546, U 802, U 805, U 858, U 889	U 530, U 550, U 1231

From the above table we can see that Turm IVs did not originally have these extra bars and that implementation was in early 1944.

Overhead railing bars - The VIICs and IXs at the end of the war also had an extra set of railing bars which ran overhead the lower platform. Not surprisingly given our knowledge of the wide variety of differences in features within the U-bootwaffe, there were different styles as follows -

- Style 1 - three bars on each side of lower platform only; no overhead bar; no connecting bars.
- Style 2 - three bars on each side of lower platform plus overhead bar; no connecting bars.
- Style 3 - three bars on each side of lower platform plus overhead bar; two connecting bars to upper platform.
- Style 4 - two bars on each side of lower platform plus overhead bar; two connecting bars to upper platform.
- Style 5 - one bar back and up from vertical 4; one bar sideways and horizontal from vertical 6, one bar diagonal from bottom of vertical 6; overhead bar includes two diagonals; no connecting bars.
- Style 6 - two bars on each side of lower platform (one of which met lower down than top bar); no overhead bar; no connecting bars; Y shape back from upper platform.

Styles 3 and 4 have connecting bars forward to the upper platform while others do not. Style 6 may have previously had railing bars connecting to the Y shape at the upper platform. Style 2 may previously have been style 3 with the connecting bars removed or damaged

Overhead bars at rear of lower platform railings on Type IXs							
Month	**No**	**1**	**2**	**3**	**4**	**5**	**6**
Dec 43	U 865, U 866, U 867						
Jan 44	U 869						
Feb 44	U 870			U 550			
Mar 44	U 873						
Apr 44			U 877, U 878, U 879				
May 44		U 880				U 505	
Aug 44				U 547			
Feb 45				U 870			
May 1945		U 861, U 889		U 516, U 805, U 858	U 530		U 190

We can see that implementation occurred in early 1944. It is very likely that the overhead bars were added at same time as the extra bars on the lower platform railings.

Lattice mesh grill - A lattice mesh grill can be seen on the Turm IV towers of some VIICs and IXs. I am getting tired of saying this…but…the style and application varied between boats.

Mesh on Turm IV railings			
Boat	**Time period**	**Upper platform**	**Lower platform**
U 867	Dec 43	None	None
U 869	Jan 44	None	None
U 870	Feb 44	None	None
U 515	Mar 44	Up to mid-level bar	?
U 873	Mar 44	None	None
U 879	Apr 44	None	None
U 880	May 44	None	None
U 181	1944	None	Up to mid-level bar
U 547	Aug 44	None	Up to mid-level bar

U 155	Oct 44	Up to mid-level bar	?
U 505	May 45	Up to mid-level bar	Up to mid-level bar
U 190	May 45	None	Up to mid-level bar
U 530	May 45	None	Halfway up to mid-level bar
U 805	May 45	None	Halfway up to mid-level bar
U 889	May 45	None	Up to mid-level bar
U 505	Present day	Up to mid-level bar	None

The mesh is a feature that we can only spot close up due to the narrow diameter of the steel used on the mesh. It was not present on either side of the end of the lower platform where there was no mid-level horizontal bar as it would prohibit a crewman from passing through these two gaps. The museum boat U 505 had the mesh on lower platform removed at some point but the upper platform mesh has survived (or been replaced) and is presently on the boat.

The implementation of the mesh appears to be in the first half of 1944. This feature was quite possibly added at same time as the extra railing bars on the lower platform railings and the overheads.

Revell kits

Revell's U 190 kit (05133) uses the railings, ammunition containers and insulator positions from their earlier U 505 kit (05114). The real U 505 as well as both the U 505 and U 190 kits had three ammunition containers on the port side and two on the starboard side, whereas the real U 190 had the opposite arrangement of two on the port side and three on the starboard side. There were different railing gaps to reflect this difference. This means that modellers who choose U 190 as their subject need to alter the railings and the ammunition containers. The insulators also need to be changed for U 190 as they copy the U 505 positions. We see the same errors in respect to the other railing features. In regard to the extra bars on top of the rear railings, the U 505 kit uses style 1H/3V as per the real U 505. The U 190 kit copies the 1H/3V style from the U 505 kit rather than the 1H/4V style on the real U 190. In regard to the overhead railings, both the U 505 and U 190 kits use style 5 as per the real U 505 but the real U 190 was outfitted with style 6. There is no mesh on the U 505 or U 190 kits but this will be due to the limitations of injection-moulded plastic.

Part XIII - Mid-to-Late War Features

In our final section we will discuss the late war features, some of which changed the look of the boats markedly.

Askania compass fairing

On page 9 of *U-Boot Im Focus* Edition 2, it is stated that a new type of compass - the "*Askania*" type - was ordered for new boats on the 15th October 1942. Shaped like an inverted cone, the new housing was entirely separate from the tower and was located just ahead of the old location. The majority of Type IXs at the end of the war were fitted with the *Askania* magnetic compass but plenty of boats which lasted until the end of hostilities still had the old fairing.

The following is a list of boats evidenced with each type -

- Old magnetic compass fairing
  - U 160, U 172, U 176, U 178, U 180, U 181, U 183, U 188, U 190, U 193, U 196, U 199, U 200, U 515, U 516 (1942), U 527, U 528, U 530, U 532.

- Askania magnetic compass fairing

➢ U 170, U 516 (1945), U 534, U 539, U 541, U 544, U 546, U 802, U 803, U 804, U 805, U 843, U 848, U 858, U 861, U 868, U 869, U 870, U 873, U 875, U 877, U 883, U 889, U 1227, U 1228, U 1231, U 1233, U 1234, U 1235, U 1237, U 1238.

The following table shows the process of changeover from a launch date a few months before and a few months after the expected change for each of the three different shipyards. The bold red text in brackets indicates the last old and the first Askania for the *Deutsche Werft* shipyard. The bold purple text in brackets indicates the last old and the first old compass fairing for the *A G Weser* shipyard. The bold green text in brackets indicates the last old and the first old compass fairing for the *Seebeckwerft* shipyard.

Type IX magnetic compass type				
Boat	**Variant**	**Shipyard**	**Launch date**	**Compass type**
All boats prior to this point had the old compass fairing				
U 167	IXC/40	Seebeckwerft, Bremerhaven	05/03/42	======**(Old)**
U 168	IXC/40	Seebeckwerft, Bremerhaven	05/03/42	?
U 186	IXC/40	A G Weser, Bremen	11/03/42	Old
U 187	IXC/40	A G Weser, Bremen	16/03/42	Old
U 521	IXC	Deutsche Werft, Hamburg	17/03/42	Old
U 188	IXC/40	A G Weser, Bremen	31/03/42	**Old**
U 522	IXC	Deutsche Werft, Hamburg	01/04/42	Old
U 196	IXD2	A G Weser, Bremen	24/04/42	**Old**
U 523	IXC	Deutsche Werft, Hamburg	15/04/42	Old
U 524	IXC	Deutsche Werft, Hamburg	30/04/42	Old
U 189	IXC/40	A G Weser, Bremen	01/05/42	Old
U 525	IXC/40	Deutsche Werft, Hamburg	20/05/42	Old
U 197	IXD2	A G Weser, Bremen	21/05/42	Old
U 526	IXC/40	Deutsche Werft, Hamburg	03/06/42	Old
U 527	IXC/40	Deutsche Werft, Hamburg	03/06/42	**Old**
U 169	IXC/40	Seebeckwerft, Bremerhaven	06/06/42	?
U 170	IXC/40	Seebeckwerft, Bremerhaven	06/06/42	===**(Askania)**
U 190	IXC/40	A G Weser, Bremen	08/06/42	**Old**
U 198	IXD2	A G Weser, Bremen	15/06/42	Old
U 528	IXC/40	Deutsche Werft, Hamburg	01/07/42	**Old**
U 191	IXC/40	A G Weser, Bremen	03/07/42	Old
U 199	IXD2	A G Weser, Bremen	12/07/42	**Old**
U 529	IXC/40	Deutsche Werft, Hamburg	15/07/42	**Old**
U 530	IXC/40	Deutsche Werft, Hamburg	28/07/42	**Old**
U 192	IXC/40	A G Weser, Bremen	31/07/42	Old
U 531	IXC/40	Deutsche Werft, Hamburg	12/08/42	Old
U 200	IXD2	A G Weser, Bremen	20/08/42	**Old**
U 193	IXC/40	A G Weser, Bremen	24/08/42	++++++**(Old)**
U 532	IXC/40	Deutsche Werft, Hamburg	26/08/42	----------**(Old)**
U 847	IXD2	A G Weser, Bremen	05/09/42	?
U 533	IXC/40	Deutsche Werft, Hamburg	11/09/42	?
U 194	IXC/40	A G Weser, Bremen	22/09/42	?
U 534	IXC/40	Deutsche Werft, Hamburg	23/09/42	------**(Askania)**
U 848	IXD2	A G Weser, Bremen	06/10/42	+++**(Askania)**
U 535	IXC/40	Deutsche Werft, Hamburg	08/10/42	Askania

U 841	IXC/40	A G Weser, Bremen	21/10/42	Askania
U 536	IXC/40	Deutsche Werft, Hamburg	21/10/42	Askania
U 849	IXD2	A G Weser, Bremen	31/10/42	Askania
U 801	IXC/40	Seebeckwerft, Bremerhaven	31/10/42	Askania
U 802	IXC/40	Seebeckwerft, Bremerhaven	31/10/42	**Askania**
U 537	IXC/40	Deutsche Werft, Hamburg	07/11/42	Askania
U 842	IXC/40	A G Weser, Bremen	14/11/42	Askania
U 538	IXC/40	Deutsche Werft, Hamburg	20/11/42	Askania
U 539	IXC/40	Deutsche Werft, Hamburg	04/12/42	**Askania**
U 850	IXD2	A G Weser, Bremen	07/12/42	Askania
U 843	IXC/40	A G Weser, Bremen	15/12/42	**Askania**
U 540	IXC/40	Deutsche Werft, Hamburg	18/12/42	Askania
U 844	IXC/40	A G Weser, Bremen	30/12/42	Askania
U 541	IXC/40	Deutsche Werft, Hamburg	05/01/43	**Askania**
All boats after this point had the Askania fairing				

Seebeckwerft - The final observed occurrence of the old style was on U 167 launched on the 5th March 1942. The first observed occurrence of the new Askania was on U 170 on the 6th June 1942. Given that U 168 was launched on the same day as U 167 it is likely that this boat also had the old style. U 169 was launched on the same day as U 170 so it is likely that U 169 also had the Askania. If this is true, then U 168 was the last *Seebeckwerft* boat with the old style and U 169 was the first boats from this shipyard (indeed the first IX) to be fitted with the Askania.

A G Weser - The final observed occurrence of the old style was on U 193 launched on the 24th August 1942. The first observed occurrence of the new Askania was on U 848 on the 6th October 1942. It is unclear which style was present on U 847 and U 194.

Deutsche Werft - The final observed occurrence of the old style was on U 532 launched on the 26th August 1942. The first observed occurrence of the new Askania was on U 534 on the 23rd September 1942. It is unclear which style was present on U 533.

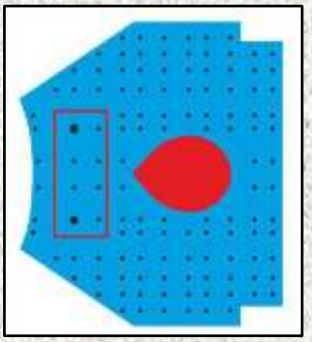
From the information above we can see that the changeover on launched boats occurred on the *A G Weser* and *Deutsche Werft* boats in the autumn of 1942. Assuming that we can trust a photo showing U 170 with the Askania, the implementation on *Seebeckwerft* boats happened earlier, in the summer of 1942.

Although U 516 had both types of fairing, this is considered unusual. When the fast dive foredeck was added to U 516, the boat was fitted with a new planked deck and the opportunity was taken to add the Askania at that point. Generally speaking we might think that it was unusual for the Askania to be retrofitted to existing boats. This was not fitted to U 190 when a new planked deck was fitted.

Revell kit - Revell's late war IXC/40 kit (05133) correctly depicts U 190 with the old magnetic compass fairing. However, most boats which lasted to the end of the war had the Askania, meaning that the kit should be converted to the Askania type for many other boats in May 1945. This is made more difficult for the modeller because the Askania on Type IXs was mounted on a metal plate. If converting the Revell kit to an Askania the modeller has to remove the old style fairing, block up the gap at the front of the tower, add this metal plate to the deck and then add an Askania over the top of the metal plate. The metal plate was only on IXs, not on VIICs and VIIC/41s, though the reason for this difference is unclear.

Left (101): The metal baseplate and Askania can clearly be seen ahead of the tower on U 889.

Below (102): A drawing of the baseplate, with the right hand side being towards the bow and the left towards the tower. The red shape is where the Askania would sit and the red rectangle is a hatch. The black holes are drainage holes.



Tower armour

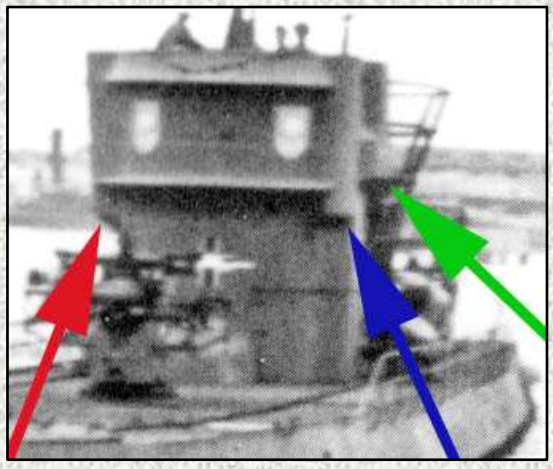
Armoured boxes (coal scuttles) - Following an order issued on the 4th June 1943, armoured boxes were fitted to some towers to protect lookouts from aircraft fire. Known as *Kohlenkasten* (coal scuttles), they are referred to as air raid shelters in interrogation reports. Generally the port box was to house one crewman, while the starboard box was to house five men. Due to the presence of the radar box on the port side, the port armoured box was smaller and was mounted directly ahead of the radar box.

The armoured boxes were fitted in the summer and autumn 1943, with U 515 being fitted in August 1943 and U 510 and U 516 fitted around September 1943.

Evidence of armoured boxes on Type IXs		
Month	**No**	**Yes**
Apr 43	U 510	
May 43	U 200	
Jun 43	U 103, U 108, U 123, U 530	U 155
Jul 43	U 66, U 154, U 172, U 515, U 532	
1943		U 544
Aug 43	U 106, U 510	U 515
Sep 43	U 516	
Nov 43		U 107, U 510, U 849
Dec 43	U 537	
Jan 44	U 505	U 801, U 852
Feb 44	U 801	U 516
Apr 44		U 154
May 44	U 170*	
Jun 44	U 505	
Sep 44	U 548	
May 1945	U 805	U 516
Unknown time		U 103, U 515, U 805, U 848, U 849, U 868
*Evidence of box having previously been present		

Since the excessive weight of the boxes reduced the stability of boats in high seas, an order was issued on the 30th October 1943 to remove the boxes. It took time for the removal to take place,

especially if boats had been at sea for many months on long range patrols. As can be seen in the table on the previous page, U 154 retained the boxes until April 1944 but this is possibly because there was not enough time during the short refit over the Christmas period. The boxes remained on U 801 until January 1944 due to this boat sailing on patrol on the 6th November 1943, only a week after the order was placed. We might conclude that the removal took place on U 801 in January or February before sailing on her final patrol at the end of February 1944.



Left (103): U 155 in June 1943. The red arrow points to the starboard armoured box, the blue arrow points to the port armoured box and the green arrow points to the radar box behind.

Armoured plate at the front of the tower - Another measure to protect lookouts from enemy aircraft fire was an armoured plate added directly to the front face of the tower above the spray deflector from early 1943 onwards. According to interrogation reports, a 16mm plate was added to U 177 in late 1943, an 8mm plate was fitted to U 185 in January 1943, and a plate of unknown thickness was fitted to U 506 between May and July 1943. Additional armour was reportedly fitted to U 856 in February 1944; this may have replaced a thicker plate or referred to another position.

Armoured doors - Armoured steel doors were fitted to Type IXs between the bridge from the upper platform, with the thickness given as 22mm in an interrogation report. The doors (or gates) were fitted to U 185 in January 1943 and U 506 between May and July 1943. They were present on U 523 in August 1943 and on U 848 in September 1943. We might suggest that they were added to the fleet in the first half of 1943. Given the commonality in purpose with the armoured plate, it may be that this feature was also added from late 1943 onwards.

On U 523 the crew would shut one door but leave another open to permit access from the tower to the platform. The doors were not deemed to be satisfactory, which raises the question as to whether they were removed at some point.

Mid-to-late tower features

Hydraulically extendable mast antenna - Like many VIICs, the early Type IXCs had a fairing on the port side of the tower to house a hydraulically extendable mast antenna which extended around 20 to 22 feet above the tower bulwark. It tended to be used in very rough weather or to transmit when a convoy had been sighted but its performance was unsatisfactory. On the VIICs the housing was a rounded shape, whereas on the IXCs the fairing was smaller and almost akin to a rounded triangle. The order to remove the rod antenna was issued on the 19th November 1942. This antenna was in the position taken by the radar box so it is likely that the radar displaced the mast antenna on most boats. The hydraulically extendable shaft formerly used to raise the mast antenna may have been used to raise and lower the mattress radar antenna. The IXD2 U 862 retained the extendable rod aerial late in the war in a position directly ahead of the radar box.

Radar box - As discussed in Part XI, the radar box for FuMO 30 was implemented in early 1943 or,

as some sources state, possibly late 1942. The FuMO 61 used the same box when it replaced FuMO 30. The late war boats with Turm IV such as U 805, U 853, U 861, U 862, U 866, U 875, U 889 and U 1232 had a bar running around the top of the radar box but boats such as U 190 and U 505 did not.

Right (104): U 510 in August 1943 with the radar box for the FuMO 30 radar.

Ammunition containers - When the Turm IV was installed, waterproof and pressure-tight ammunition containers were fitted to both platforms. These were normally housed inside oval-shaped boxes with a straight edge at the side of the platform. There were different arrangements as follows -

- U 879 - April 1944
  - Upper platform - 1 in box in centre.
  - Lower platform - 2 in box on starboard side; 2 in box on port side.

- U 505 - May 1944
  - Upper platform - 1 in box in centre.
  - Lower platform - 2 in box on starboard side; 3 in box on port side.

- U 190 - May 1945
  - Upper platform - 1 in box in centre.
  - Lower platform - 3 in box on starboard side; 2 in box on port side.

- U 805 - May 1945
  - Upper platform - 1 in box in centre; the periscope housing was extended outwards with a container roughly two-thirds the height of the housing added.
  - Lower platform - 2 in box on starboard side; 2 in box on port side; 4 large containers of very low height (2 per side); seats added directly over the front 2 large containers.

- U 889 - May 1945
  - Upper platform - 1 in box in centre; the periscope housing was extended outwards with the addition of a container roughly two-thirds the height of the housing.
  - Lower platform - 2 on starboard side; 2 on port side; 1 larger circular container on starboard side at front of lower platform.

As previously mentioned, Revell's U 190 kit (05133) uses the ammunition containers positions from their earlier U 505 kit (05114). If modelling U 190 the container boxes need to be cut out and reversed on the U 190 kit.

Front railing - Type IXs in the late war period typically had a railing bar all the way around the front of the lower half of the tower. The change is likely to have been made during the fitting of the Turm IV or perhaps 1944. One exception where this was not the case was U 190 in May 1945.

Anti-slip strips - Anti-slip strips were present around each of the three weapons on late war Turm IVs. The strips were much thicker in height than the strips around the deck guns or capstan in the early war period and are likely to have been wooden. Boats such as U 190 and U 889 in May 1945 had an additional double row of anti-slip strips on the upper platform which were arranged in two circles around each weapon; these additional strips were not present on U 805. These strips were not present on U 865, U 866, U 867, U 869 and U 870 when they were commissioned with Vierlings between October 1943 and February 1944, nor on U 879 when commissioned without a lower platform weapon in April 1944. Nor were these strips present when U 505 departed on her last patrol in May 1944. It is unclear when the wooden strips were added but it may be in the latter half of 1944 or in 1945.

Bendy pipes - On U 805, U 869, U 870 and U 889 there was some form of pipe running diagonally out of the rear of the underside of the upper platform which turned to become vertical. The top was held in place in a circular holder welded to the edge of the upper platform outboard of the ladder. There was one pipe on each side and this feature was only present on Turm IV towers. On U 190, U 505 and U 516 the pipe started from the front of the floor on the lower platform. The pipe then curved towards the underside of the lower platform, ran parallel to the lower platform and then became a diagonal like the feature on U 889. U 190, U 505 and U 516 were all built with Turm 0 then converted to Turm II and then Turm IV, which may (or may not) explain the difference compared to boats which never had a previous Turm arrangement.

37mm spare barrel container - When the 37mm automatic was introduced, a ready container was also fitted to the starboard side of the tower to some boats. Consisting of a long thin tube, it housed a replacement barrel for the 37mm weapon. On U 190 the spare barrel container was present on the port side of the upper platform whereas on U 505 there was a barrel container on the starboard side below the railings on the upper platform. There was no tube on U 869, U 870 and U 880 in May 1944, nor on U 516 and U 889 in May 1945. It was present on the port side on U 546 in June 1944.

20mm spare barrel container - On U 505 in June 1944, the top of a smaller diameter tube protruded out of the side of the very front of the starboard side of the lower platform. This may have been to house a spare 20mm barrel. On U 190 was a pair of tubes mounted vertically directly at the rear of the upper platform which may have been to house two spare 20mm barrels. Neither of these features on the real U 190 and U 505 are present on the kits depicting these boats.

Rescue dinghy containers - Some Type VIICs, VIIC/41s and IXs had two bulbous hatches on either side of the rear of the Turm IV, which each contained a rescue dinghy. On the VIIC U 826 in May 1945, only the round hatch could be seen at the rear. On U 889 in 1945 the cylinders effectively protruded quite far out the end rather than just the hatches. The hatches were present on the rear of U 861 and possibly U 874 but the length is unknown. On U 190 in May 1945 the hatches were on the side rather than the rear. This feature was not present on U 505 when the boat departed on her last patrol in May 1944, nor on any other boats at that time. This feature was fitted to only some boats, for example they were absent from U 516, U 530, U 805 and U 858 in May 1945. The implementation period may be late 1944 or more likely 1945.

Damaged wind deflector - It was not uncommon for Type IXs to have sections missing from the wind deflector. Sections of the thin steel shearing off was a problem that was particularly prominent on late war boats but did also occur in the early war period. The list of boats that this occurred on includes, but is not limited to, U 106, U 108, U 126, U 190, U 505, U 530, U 539, U 541, U 550, U 805, U 870, U 889, U 1227 and U 1228. Modellers should beware that U 190 had the damaged section on the starboard side repaired by a Canadian yard.

UZO - *Uberwasserzieloptik* (torpedo aimer) - In the mid-war period, the existing UZO column was replaced with a new type with a circular plate on the starboard side. U 66 had the old style in April 1943, U 537 had the new style in October 1943 and U 532 was fitted with the new style in May 1943. It would appear that the implementation occurred around the spring of 1943 but for some reason U 505 still retained the old style in May 1944.

Direction-finding loop - An additional antenna was added to the direction-finding (D/F) loop on late war VIICs, VIIC/41s and IXs. A round area of the antenna was present above the top of the circular loop, with an aerial directly above. When the D/F loop was retracted into its housing, the parts above the loop would still be visible. U 805 did not, for some reason, have the aerial on top but did have the round area protruding out the top of the direction-finding gap. Initially the *Tunis* combination was present in the D/F loop but when the aerial was added *Tunis* had to be moved to a pole between the periscopes.

Above (105): The newer style of UZO column was offset to port on Type IXs.

Below (106): U 889 in May 1945, showing the newer style of direction-finding loop with a round area and aerial on top. The *Tunis* combination is mounted on a pole, with the horn-shaped *Mücke* facing away from us and the curved-shaped *Fliege* on the front.

The newer style of D/F loop was not present during the following points in time: U 170 and U 516 in February 1944, U 539 in March 1944, U 505 in May 1944, U 154 and U 550 in April 1944, U 546 in June 1944, and U 155 and U 548 in August 1944. The newer style was present during the following points in time: U 805 in spring 1944, U 802 in July 1944, and all boats in May 1945. It is considered that this feature was added from the spring of 1944 onwards, with implantation completed around late autumn 1944.

Periscope housing - In May 1945 U 190 had some form of vertical pole added to the end of the periscope housing and a round object at the front of the housing.

Longer periscopes - The IXD2 U 177 had longer periscopes fitted in November and December 1943 to provide an extra two metres length. It may be that other boats were similarly outfitted.

Wooden planks - On the top of both tower bulwarks on some late war boats were wooden planks but the style and number was inconsistent. U 516 had four planks, U 805 had five planks, U 190 had one plate which was possibly wooden and U 889 had none.

Curved bar - There was a curved bar added as standard to the top of the tower bulwarks on the early IXCs. U 505 retained the curved bar on the starboard side but it was absent from the port side, quite possibly due to the addition of the radar box on the port side. This feature was absent from the top of the bulwarks on U 190, U 530, U 805 and U 889 due to the wooden planks added to the top of the bulwarks. However it was still present on the starboard side of U 534 in 1945 and on U 532 directly ahead of the radar box.

Mid-to-late deck features

Lookout mast - A 15-metre long lookout mast was installed to the port side of the aft deck of U 183, U 184, U 185 and U 187 when they were commissioned in the spring and summer of 1942. The mast was hydraulically extendable and connected to the tower via an additional fairing built onto

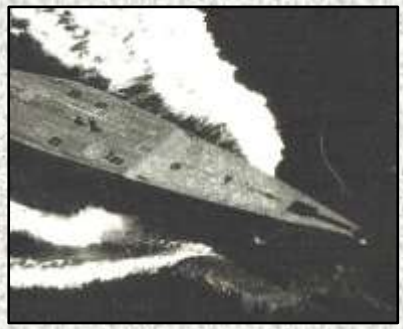
the port side of the rear of the Turm 0 tower. The mast broke during the trials on U 187 in the Baltic. The mast was strengthened on U 185 and U 187 (and presumably also U 183 and U 184) in the autumn of 1942 but could not be used above Force 3 conditions. One difficulty was the time required to retract the mast from the upright position back to the flat position on the aft deck. This made the boat vulnerable to air attack as RAF aircraft would not wait until the huge mast was lowered before making an attack. Arguably it would also have made the boat more visible to enemy aircraft. The mast was shortened to 12 metres in early 1943. The masts were then removed from U 183 and U 185 in May 1943 when air attack became more of a concern. U 184 and U 187 had already been sunk by this time, presumably with the lookout mast still present.

KDB removal - Type IXs were originally outfitted with a KDB (*Kristalldrehbasis Gerät*) device consisting of a rotating T-shaped piece with six acoustic listening devices (hydrophones). Housed on the foredeck, this rotating device could be extended or retracted into the deck. Used in conjunction with the *Gruppenhorchgerät* (GHG, group listening apparatus), the KDB was effective only at slow speeds. It is perhaps this limitation which led to a removal order on the 24th April 1942. The KDB was removed from U 164 in June 1942, from U 185 in September or October 1942 and from U 513 in November 1942. It was not present on U 517 in November 1942 but was retained on U 172 by commander's request.

Cargo hatch - The IXD2 U 873 had a cargo hatch added over the diesel room, with the work beginning in July 1944.

Underwater refueling - As a result of the loss of most of the Type XIV tankers (Milk cows), some Type VIICs, VIIC/41s and IXs were fitted with underwater refuelling by the end of the war. This consisted of a rectangular gap plus channel gap behind the top of the stem. The jumping wire attachment point was moved directly behind the rectangular gap. The IXCs U 1231, U 1233, U 1234, U 1235, as well as the VIIC U 1056, were all built with this system installed. They were commissioned between February and May 1944 but the first of these boats was launched in November 1943. It appears that the system was tested in July 1943 on a Dutch submarine, with implementation of newly-built boats beginning later in 1943. This feature was retrofitted on existing boats but this took a long period of time and some boats had yet to be fitted with the underwater refuelling by the end of the war. In May 1945 U 806, U 848, U 858, U 873 and U 883 all had this system but U 532, U 534, U 802 and U 889 did not.

Right (107): U 858 in 1945 with the underwater refuelling rectangle and channel on the bow. Excellent drawings and more information can be found in *An Illustrated Guide To U-Boat Research* by Simon Morris.



Liferaft containers on forward deck - Many Type VIICs and VIIC/41s had up to four liferaft containers on the port side of the foredeck in the late war period. Adding the containers in this position was not possible on IXs with the fast dive foredeck. U 1231, which did not have the fast dive foredeck, had five liferaft containers on the foredeck: three on the starboard side and two on the port side. One plan for a Type IXC/40 with the fast dive foredeck shows four containers on the port side roughly in the location where torpedo container A used to be. The text in the plan states that the containers were for five crewmen each but these four liferaft containers do not appear in photos of late war IXs. A different plan for an IXC/40 with the fast dive foredeck shows five liferaft

containers in this same position, though it is unclear whether the tops are meant to protrude above the top of the deck or whether the container were internal. It is possible that some IXs had liferaft containers stored internally under deck planks. A number of late war IXs including U 516, U 802 and U 858 had a tall container ahead of the Askania which may have been a liferaft container. The German U-bootwaffe certainly had a need for them given the extremely heavy losses suffered by U-boat crews in the late war period.

Fast dive foredeck - The fast dive foredeck (*Schnelltauchback* - also known as "cut out foredeck" or "cut away bows") was a major modification that was exclusive to the Type IXs towards the end of the war. The large size of the Type IXs had implications upon their ability to dive quickly. When the need to evade approaching aircraft became more desperate, an attempt was made to reduce the diving time of Type IXs by cutting out a large section on either side of the foredeck. This alteration produced a very identifiable visual change but whether the modest improvement in diving time was worth the time and expense involved in this significant modification is debatable.

On pages 33 and 34 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle, the authors list the IXCs and IXC/40s which received the fast dive foredeck and the dates when the alteration was completed. Their list includes U 170, U 190, U 516, U 530, U 539, U 804, U 805, U 858, U 866, U 867, U 868, U 869, U 878, U 879, U 880, U 1226, U 1232, U 1233 and U 1235. I would like to suggest that U 195, U 853, U 864, U 870, U 872, U 873, U 874, U 875, U 877, U 883 and U 1228 were fitted as well. Köhl and Niestle also list U 548, U 518, U 853, U 857 and U 881 as having a possible conversion. This feature was not universal by the end of the war, with U 532, U 534, U 802, U 889, U 1228 and U 1231 being some examples of IXs which did not receive this modification.

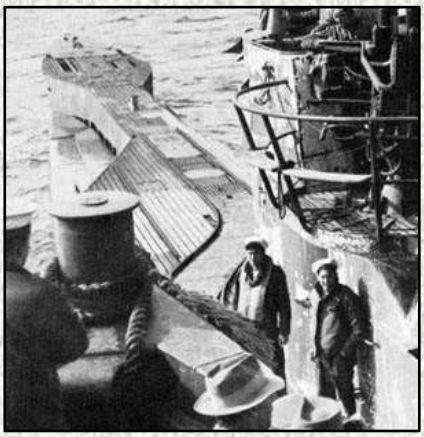
Above (108): The IXD2/42 U 883 with a fast dive foredeck.

Below (109): When the fast dive foredeck was added to the IXC/40 U 190, most of the wooden deck was replaced with the planked style that was standard at the time. Here we can see that the very front section of the foredeck was left in the old slotted deck style.

The test boat for this feature was U 866, with the extensive modification being completed between January and March 1944. U 866 did not have a *schnorchel* at that point, making it an unusual combination for modellers. U 539 had a different style known as style B, as opposed to the more normal style A. The fast dive foredeck modification was completed at least seven different yards so there would have been differences even within style A. Usually boats were confined to a shipyard refit for two to three months. The next completion dates are August 1944 (2), September 1944 (3), October 1944 (2), November 1944 (2), December 1944 (2), January 1945 (7), February 1945 (1) and March 1945 (1). These are the dates provided in Köhl and Niestle (with two additions by the author) and there will be others not counted here such as all the IXDs. In general the figures above provide a general idea of the completion dates. Other than the test boat U 866, we may surmise that completions began in autumn 1944 and continued throughout the winter of 1945, with a spike in completions in January 1945.

Some enthusiasts may come to believe in two fallacies - firstly, that the fast dive foredeck was an exclusive feature of the IXC/40; and secondly, that this feature was added to all IXC/40s. Although quite understandable, both these assumptions are erroneous. Many Type IXC/40s were built before the introduction of this fast dive foredeck and were therefore launched with the normal deck. It is also true that the fast dive foredeck was added to IXs regardless of variant or sub-variant.

The modification required the removal of torpedo storage containers. This was not an issue as late war boats were not firing as many torpedoes and moving the torpedoes from the containers inside the boats had become an even more perilous enterprise due to the threat from air attack. Lastly, double footholes were added above the fast dive foredeck on U 190, U 875 and U 883 but not U 805 and U 858.



Above (110): The torpedo rails on U 805 after surrender in May 1945.

Torpedo trolley rails - When boats were fitted with the fast dive foredeck, they were also fitted with a set of torpedo trolley rails. The rails began on the port side of the tower, turned at a 45-degree angle, and then turned again to run centrally along the foredeck up to the point where the narrow section of the fast dive foredeck began. Boats without the fast dive foredeck did not receive this modification.

Schnorchel - Most of the Kriegsmarine U-boat types were essentially submersibles rather than true submarines, spending the vast majority of their time sailing on the surface using their diesel engines and submerging only when necessary. Using electric motors below the surface, the boats had limited endurance and slow underwater speed. When Allied aircraft became an existential threat to U-boats travelling on the surface, the Germans had to resort to fitting a *schnorchel* mast (snort) to their boats. When extended, the top of the mast above the surface allowed air to be sucked in for the diesel engines and exhaust fumes to be expelled while also recharging the batteries. U-boats essentially changed from being surface vessels with the capacity to submerge into submarines which sailed just under the surface at only around six knots. The *schnorchel* system allowed boats to travel for an extended period underwater and spent the majority of an operational patrol with only the *schnorchel* head above the surface.

The *schnorchel* was added to the port side of VIICs and VIIC/41s and the starboard side of IXs. On the Type IXs the system included a hinged mast on the deck, a clamp on the tower to hold the mast upright, and air trunking on the starboard side of the tower. The diesels had to be modified in order for the *schnorchel* to function. An essential guide to which boats were equipped with the *schnorchel* can be found at -

http://www.uboat.net/technical/schnorchel_fitted.htm

This link details which U-boats were fitted with the *schnorchel* and the month in which the device was fitted. Another very helpful guide can be found on page 30 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle. The authors list the IXCs and IXC/40s which received the *schnorchel*, the type of device, and the dates in which the device was fitted.

The *schnorchel* was test fitted to the small training Type IICs U 57 and U 58 in July 1943. These boats used a periscopic mechanism to raise and lower the *schnorchel* and a version of this type was later incorporated into the XXIs and XXIIIs. The first VIICs to be test fitted were U 235 and U 236 in September 1943. These *schnorchels* had the mast raised from the horizontal position within the deck to the vertical position where it was clamped to the tower. It was this clamped system (*klappmast*) which was used as standard within all medium and large U-boats (VIICs, VIIC/41s, IXs, XBs and one XIV) but the locations varied between boats due to their different size

and arrangements. Several torpedo containers were deleted as a result of the fitting of the mast to Type IXs.

The first *schnorchels* were ordered on the 12th August 1943, with a further order on the 27th September 1943 urging new boats to be fitted as quickly as possible. Priority was given in early 1944 to existing operational U-boats over boats currently in construction. After initial scepticism the feature gradually gained acceptance from mid-1944 onwards and was seen as being key to survival. The following table shows the timescale of the *schnorchel* being added throughout the U-boat fleet. Sources vary on some fitting dates, with many being unknown, so this is merely indicatory rather than conclusive.

Evidence of *schnorchel* on Type IXs				
Month	**No**	**Yes**	***Schnorchel*-equipped Type IXs added to fleet this month**	***Schnorchel*-equipped boats of all type added to fleet this month**
Nov 43			0	1
Dec 43			0	1
Jan 44		U 855	1	1
Feb 44	U 856	U 543, U 805, U 859, U 1222	4	4
Mar 44			0	9
Apr 44	U 860	U 107, U 180, U 803, U 804, U 806, U 858, U 1225, U 1234	8	21
May 44	U 170	U 530, U 549, U 821, U 1235	4	12
Jun 44	U 505	U 154, U 518, U 546, U 802, U 804, U 843, U 866, U 1221	8	19
Jul 44		U 170, U 541, U 802, U 853, U 865, U 873, U 1223, U 1227, U 1228, U 1229, U 1230	11	17
Aug 44	U 155	U 129, U 188, U 190, U 534, U 548, U 853, U 857, U 867, U 870, U 889, U 1226, U 1231	11	15
Sep 44		U 155, U 869, U 1232, U 1233	4	15
Oct 44	U 516	U 864, U 877	2	13
Nov 44		U 868, U 880	2	9
Dec 44		U 878, U 879	2	6
Jan 45		U 516, U 539, U 881	3	7
Feb 45			0	4
Mar 45			0	2
May 45	U 532			
Unknown time		U 862		

Sources: Uboat.net / Köhl and Axel Niestle (1990)
Note 1: There were many more boats fitted each month; these give a rough indication of implementation only.
Note 2: Sources vary on completion dates

The table indicates that the *schnorchel* was present on operational Type IXs from January 1944 onwards. A number of U-boats sailed in 1944 before there was an opportunity to fit the *schnorchel*. One wonders if U 505 would have escaped being captured in June 1944 if the boat had been equipped with this device. Most boats were equipped by the end of the war but U 532 is an example of a boat which had not been fitted by May 1945. U 532 departed on her final patrol in January 1945 before having the opportunity to be fitted with this feature.

U-boats were initially fitted with the ball float valve (*Kugeschwimmerventil*) but this was being replaced in 1945 by a ring float valve (*Ringschwimmerventil*). The ring float valve was first fitted to U 1233 in September 1944 (perhaps in a test capacity) and then to U 516 and U 539 in January 1945. The ring float valve replaced the existing ball float valve on U 857 in January 1945 and U 534 in March 1945. Photographs of U 516, U 534 and U 539 at the end of the war all had a large bulge on the starboard side of the deck outboard of the tower and no clamp on the tower. These features are associated with the ring float valve version of the *schnorchel* and make for notable differences compared to the previous version. According to Köhl and Niestle (1990), U 878, U 879, U 880 and U 881 may also have been fitted with the ring float valve version between December 1944 and January 1945.

The Oelfken *schnorchel* was developed in the late war period to increase the speed from around 6 knots up to 10 or 11 knots. Two VIICs were fitted by the end of the war but no Type IXs are known to have been fitted as such.

Tarnmatte - One difficulty with the *schnorchel* was that Allied radar could detect the head above the surface. To combat this, a sound absorbing coating with a criss-cross shape known as *Tarnmatte* (camouflage coating) was added to a number of *schnorchel* heads.

Jumping wires

Jumping wire insulators - On the Turm 0 and Turm II towers in the early to mid-war period, the forward jumping wire had a splitter in which the wires split into three separate wires. The central wire had three porcelain insulators and extended back to the front of the tower. On Turm IV towers the middle wire with three insulators was removed. This middle wire was deemed unnecessary, especially when we consider the Type VIIs did not need them at all.

Aft deck jumping wire tall support posts - Some boats in the mid-to-late war period had a tall post on each side of the aft deck, directly on top of torpedo covers 7 and 8. The purpose of these posts was to keep the rear jumping wires higher up than would otherwise be the case. The table below shows some of the boats which had this feature.

Aft deck single jumping wire support posts on Type IXs		
Month	**No**	**Yes**
Apr 43	U 850 (Turm II)	
May 43		U 846 (Turm II), U 851 (Turm II)
Jun 43		U 853 (Turm II)
Jul 43		U 854 (Turm II), U 859 (Turm II)
Sep 43	U 857 (Turm II)	
Oct 43		U 865 (Turm IV)
Nov 43		U 866 (Turm IV)
Dec 43		U 864 (Turm II), U 867 (Turm IV)
Jan 44		U 869 (Turm IV)
Feb 44		U 870 (Turm IV)
Apr 44	U 879 (Turm IV)	
May 1945	All boats	

This appears to be a feature on *A G Weser* boats from spring 1943 to early 1944. U 857 was an exception which utilised the outward facing tripods. The tall posts were present on both Turm IIs and Turm IVs so was not tower specific. U 846 only had a post on the port side, with perhaps a tripod farther back on the deck on the starboard side. The reason for this is unclear. The photos which are available from the commissioning ceremonies of *A G Weser* boats tend to be taken in the same location from a similar angle. This angle obscures the area where the tripods would be present and often also have crewmen in front of where a starboard post would be. It is possible that other boats were also missing the starboard post.

Reversed jumping wires - The traditional arrangement on U-boat jumping wires was one wire over the foredeck and two wires leading back over the aft deck via the top of two tripod supports to the metal section near the stern. On some VIIs and IXs the arrangement was reversed, with two wires over the foredeck and one over the aft deck. The front jumping wire passed forward from either side of the tower towards two separate tripods on the foredeck. The single aft wire passed rearwards from a dedicated post positioned at the rear of the lower platform over the aft deck to a single tripod on the metal section near the stern. The arrangement looks odd to those of us who are used to the traditional format. There should be no technical advantage or disadvantage to the reversed arrangement so the reason why it was adopted is unclear.

U 161, U 177, U 193, U 194, U 532, U 844 and U 850 all had this arrangement when fitted with the Turm II tower, as did the VIICs U 427 and U 977. When U 532 and U 977 were changed to Turm IV they reverted to the traditional arrangement of two at the front and one at the rear. It is expected that other boats also followed this practice when changed to Turm IV standard.

Tripod jumping wire supports - The Type VIIs all had two tripod supports on the aft deck. In contrast, all Type IXs with the original Turm 0 tower did not have the tripods, with the aft jumping wires going directly from the tower straight into the metal section of the aft deck. As previously discussed, a number of IXs with the Turm II tower had a single tripod and one aft jumping wire while others had a tall support posts on either side of the aft deck. Many IXs with the Turm IV tower had two tripods on the front of the metal deck section in a style reminiscent of the early-to-mid-war Type VIIs. Other IXs equipped with the Turm II or Turm IV had two higher outward facing tripods positioned farther ahead. These were positioned within the wooden deck inboard of torpedo covers 9 and 10. The reason for having these tripods facing noticeably outwards is that their base position was inboard of the torpedo covers rather than at the edge of the deck.

The following shows some of the boats which had each type of aft jumping wire support -

- No tripods (two wires)
  - All Turm 0 boats.

- Single tripods - rear central position (one wire)
  - U 161, U 177, U 193, U 194, U 532, U 844, U 850 (Turm II).

- Tall support posts - forward position (normally two posts)
  - U 846, U 851, U 853, U 854, U 859, U 864 (Turm II).
  - U 865, U 866, U 867, U 869, U 870 (Turm IV).

- Two outward facing tripods - forward position (two wires)
  - U 106, U 180, U 509, U 510, U 857 (Turm II)
  - U 155, U 172, U 518, U 532, U 802, U 805, U 857, U 1231 (Turm IV).

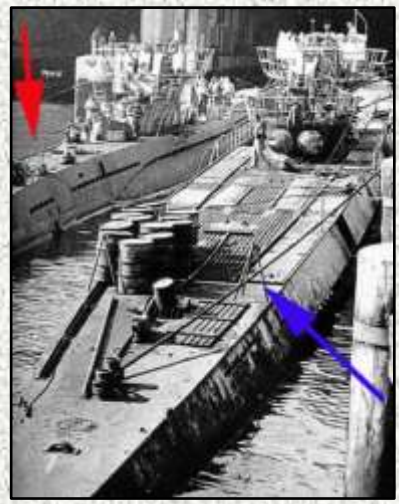
- Two tripods - rear position (two wires)
  - U 129, U 170, U 181, U 190, U 505, U 510, U 516, U 530, U 858, U 866, U 867, U 868, U

869, U 889 (Turm IV).

U 155 and U 180 both had no tripods when equipped with a Turm 0 and were changed to the outward facing tripods when Turm II was fitted. U 532 originally had the reversed jumping wire arrangement when operating with a Turm II and was changed to the outward facing tripods when a Turm IV was fitted.

Due to time frame considerations we may ask if the outward facing tripod style was exclusive to planked decks. This theory is disproved by a mix of slotted decks and planked decks having this style with the Turm IV tower: U 155, U 172 and U 518 had the slotted deck and outward facing tripods in the late war period while U 805, U 805 and U 1231 all had the planked deck and outward facing tripods. The same holds true for the tripods in the rear position.

The U 190 Revell kit (05133) and U 505 Revell kit (05114) both correctly have the tripods in the rear position but would need to be altered if depicting a boat such as U 805. The early war Revell kit (05166) has the option for the rear tripods and suggests they should be fitted for U 67 but not for U 154. The reason for this suggestion is unclear as U 67 - indeed all Turm 0-equipped Type IXs - did not have any tripod supports.



Above (111): The blue arrow points to the rear tripods on the IXD2 U 862 while the red arrow points to the style which faced outwards on the VIIC/41 U 995.

Late hull features

Balcongerät - The *Balcongerät* (balcony device) was a system consisting of 48 hydrophones housing around a round dome at the bottom of the stem. It was standard on XXIs and was fitted to some VIICs, VIIC/41s, and IXs in late 1943, 1944 and 1945. U 194 was the test boat for this device which was in place on this boat by January 1943. U 66 had this device when departing on her last patrol in January 1944, with survivors from this boat stating that all Lorient boats were expected to get this at some point. This correlates with the Lorient-based U 505, which received the *Balcongerät* between January and March 1944. Fitting of this device was not universal even by the end of the war. It was not present on U 1229 in August 1944, nor was it present on U 533 and U 546 in May 1945. The *Balcongerät* was fitted to U 805 in February 1945 and was present on U 873 and U 1228 in May 1945.

Above (112): The underside of the bow of the museum boat U 505 showing the unpainted hydrophones arranged around the dome-shaped *Balcongerät* device.

Bow dive plane wires - The wires running from the outside of the bow dive planes were removed in 1943 or early 1944.

Rudder support - Another feature to be removed in 1943 or early 1944 was the A-shaped support bracket which was connected to the bottom of both rudders and ran forward to the thick support bar near the stern.

Zweibel - The *Zweibel* system at the bow included hydrophones enclosed within a rounded housing at the forward end of the upper deck. U 889 is reputed to be the only U-boat fitted with this system and can be distinguished by the large circular bulge at the top of the stem. This boat did not have

any GHG plates on the hull which would be redundant after the installation of the *Zweibel* system.

Side cushions - U 861 and U 874 had a side cushion on the top of the hull casing underneath the forward bollards. Many VIIC and VIIC/41s had this feature in the later war period but it was unusual on Type IXs.

Other features

Bachstelze - During service in the Indian Ocean, the Type IXDs carried a Focke-Achgelis FA 330 *Bachstelze* (wagtail), which was a rotary kite used for observation purposes. Capable of only vertical flight, it was tested on the IXC U 532 in August 1942. The machine was stored within two specially built pressure proof containers at the rear of the upper platform on the IXDs. The fuselage was stored in the port container and the propeller and tail was stored in the starboard container. A third container held the winch from which it was released. There was a need for the containers to remain waterproof or the *Bachstelze* would be damaged, with a spare machine stored below. The machine was released on a 492 foot long cable from a motor-driven winch within the third container and flew upwards as the U-boat sailed forward on the surface. The rotary kite flew at a height of up to 394 feet while being towed by the U-boat below. Four civilians were required to operate the kite and were on board during the lengthy operational patrols. The *Bachstelze* was fitted to U 177 and U 860 in the early months of 1943 prior to their departures in April 1944.

Above (113): A Focke-Achgelis FA 330 *Bachstelze* being tested on U 532 in the autumn of 1942. The IXC has a yellow training band above the spray deflector, indicating that it had not yet been assigned to an operational flotilla.

One does not need a certificate in acuity to predict the drawbacks of operating the machine. Firstly, it took time to assemble the machine before it was ready for operations. When the *Bachstelze* was being towed by the U-boat, the pilot would certainly be in a better position than the crew below to spot targets and could potential identify targets up to 25 nautical miles away rather than the normal 5 nautical miles range. But one wonders what would happen when such a target was spotted. Rather than attacking a merchant ship while the pilot and machine was still tethered to the U-boat below, it is more likely that it would have to be winched back down. If the boat was to have the capacity to crash dive, the machine would then have to be disassembled and packed back in to the containers before commencing an attack. More concerning is the threat of air attack. Clearly the pilot would be dangerously exposed if an enemy aircraft arrived on the scene when the *Bachstelze* was operating. He would not be especially happy if the U-boat crash dived at that point, especially if the wire was still in position. The *Bachstelze* was only used in the South Atlantic and Indian Ocean where the threat of air attack was comparatively minimal.

Rockets - In 1941 Dr. Ernst Steinhoff, a rocket scientist at Peenemünde, discussed the idea of U-boats using rockets with his brother Kapitänleutnant Friedrich Steinhoff, commander of U 511. Admiral Karl Dönitz was keen on this idea - named *Project Ursel* - whereby a submerged U-boat would be able to fire rockets at fuel storage facilities and ports. During trials in May 1942 in the Baltic, the aft deck of U 511 was fitted with a rack housing four rockets. In early 1943 trials for rockets to strike convoy escorts was carried out. The idea for firing a V-1 rocket from a U-boat against New York was discussed in 1943. Rockets were test fitted to the VIICs U 984 and U 994, the smaller IIBs U 9, U 19 and U 24 and U A in 1943 and 1944. There were even tests for a pontoon carrying a V-2 rocket towed by a Type XXI U-boat. Thankfully the rocket proposals did not come to fruition by the end of the war and no U-boat rocket system was deployed operationally.

Anti-aircraft rocket systems were also tested in 1942 and 1943 but these did not proceed to operational service.

Note: More than one source suggest that U 551 was the test boat rather than U 511. However, the photo taken during testing is clearly a Type IXC (not a VIIC as per U 551) and Friedrich Steinhoff was commander of U 511.

Anti-sonar decoys - Code named *Bold* (short for *Kobold*, meaning "deceiving spirit" or "goblin"), the first anti-sonar decoy consisted of a large mass of air bubbles which were created beneath the surface. This produced an echo which was intended to fool Asdic operators into thinking that this was a U-boat contact. The mass of air bubbles was created using calcium hydride capsules, which were ejected from a 10cm or 15cm diameter container known as the *Pillenwerfer* ("pill thrower"). This was considered a successful system and was introduced to all operational U-boats in 1942 or early 1943. Upgraded versions - *Bold 4* (introduced in 1944) and *Bold 5* - operated at greater depths.

On U 505, which departed on her last patrol in May 1944, the two holes associated with the *Bold* ejectors appears to be on the starboard side of the hull below, and to the rear of, the starboard exhaust outlet. These holes below the waterline include a rectangle at the top and a rectangle with rounded top below and are included on all three Revell kits. Some late war boats such as U 534, U 858 and U 995 (but not U 123) had an elongated rectangle (thin in width, tall in height) which **may** be the later *Bold* style. If this is true then Revell's U 190 kit (05133) should have the elongated rectangle. The two holes on the early war kit (05166) are the same as the U 505 kit. If the holes do depict *Bold* ejector holes, then these should be filled in on a model of a U-boat prior to 1942.

In addition to *Bold* was a system known as *Sieglinde* which emitted signals mimicking the acoustic signature of a moving U-boat. This system may have been ejected from the boat using the same openings as *Bold* used. Another system was *Siegmund*, which produced loud noises intended to jam the Asdic of an Allied escort so that a U-boat could creep away.

Anti-sonar coatings - Towards the end of the war a few U-boats were outfitted with an anti-sonar measure called *Alberich*. The square anechoic tiles of approximately one metre width were added to the hull to absorb the sound waves and reduce the effectiveness of the Asdic system by an estimated 15%. Test began on the Type IIB U 11 in 1940. In April 1941 U 67 had rubber strips one metre wide added to the hull and tower but not the wooden deck. According to the interrogation report of U 67 the tiles were painted and "inconspicuous". The major difficulty was that over half of the anechoic tiles had fallen off the hull by the time U 67 sailed into Lorient in August 1941 at the end of her short 18-day maiden operational patrol. The inadequacy of the adhesive is by no means limited to wartime U-boats as many British modern submarines can be seen with gaps in their expensive anechoic tiles. The tiles were removed from U 67 at Lorient before departure on the second patrol. Although the adhesion difficulties were not fully solved, they had been improved enough by 1944 for a small number of boats to be fitted with *Alberich*. These included VIICs, VIIC/41s and one XXIII but *Alberich* is not known to have been fitted to any Type IXs other than U 67.

As previously mentioned, the *Tarnmatte* coating was coated to the heads of *schnorchels* to reduce their radar cross section.

XXI tower - This article has covered many of the external modifications and features of the Type IX fleet. The final modification is a rather strange one which was made to the very first Type IX U 37 near the end of the war. Four out of the top five most successful German U-boats (U 48, U 103, U 124, U 123 and U 107) were Type IXBs. The next most successful U-boat in terms of tonnage sunk was U 37. During 11 operational patrols U 37 sank 53 merchant ships plus two warships, which was the most of any Kriegsmarine U-boat in terms of numbers sunk. Between U 37, U 103,

U 107, U 123 and U 124, these five early IXs sank 223 merchant ships and 8 warships consisting of over 1.1 million tons of shipping. With no fewer than 11 commanders, U 37 was relegated to training in May 1941 and scuttled in May 1945. At some stage in the intervening four years, U 37 had a very special modification which made the boat look completely unlike her sister boats. The tower was completely replaced by the streamlined tower found on the XXIs, presumably to measure the hydrodynamic performance of the new type of tower compared against the old traditional style. The resulting boat really did look like a Type IXA hull with a Type XXI tower added on top. Modellers who attempt this very interesting, and somewhat weird, kit bash should know that there were yellow training stripes on the tower, forward deck and aft deck. U 37 even featured a net cutter on the bow despite the chances of this IX / XXI hybrid having to cut through a net in an enemy harbour being effectively zero.

French Navy - Several German U-boats were present in French ports after the Germans were forcefully ejected from the country. A few boats were commissioned into the post-war French Navy such as the VIIC U 471 (*Mille*), VIIC U 766 (*Laubie*), IXB U 123 (*Blaison*), IXC U 510 (*Bouan*), XXI U 2518 (*Rolland Morillot*) and the XXIII U 2326. The towers of the ex-U 123 and ex-U 510 were completely reworked, with the wintergarten platforms replaced by a streamlined tower of improved hydrodynamic design.

Imperial Japanese Navy - Two German U-boats - U 511 and U 1224 - were gifted to Japan. U 511 departed from Lorient in May 1943 with Admiral Nomura on board and arrived in Kure three months later in August 1943, whereupon it was commissioned into the Imperial Japanese Navy (IJN) as RO-500 the following month. The brand new U 1224 did not become operational with the Kriegsmarine. Instead the boat was commissioned into the Imperial Japanese Navy as RO-501 at Kiel in February 1944. Following training in the Baltic, the RO-501 sailed from Kiel with her Japanese crew in March 1944 but was sunk en route to Japan.

Six Kriegsmarine U-boats, including three Type IXDs, were present in the Far East when Germany surrendered in May 1945 and were commissioned into the Imperial Japanese Navy. U 181 became I-501, U 195 became I-506 and U 862 became I-502. These boats were surrendered to American forces and scuttled in 1946.

Part XIV - Summary Tables

Due to the numerous modifications discussed in this article, summary tables are included so that readers can find the relevant dates at a glance. These tables are updated versions of the tables within *The Wolf Pack II*. The tables are divided into three sections. The first table includes the modifications made to Type IXs. The second table includes the identification features relevant to the Type IXs; these can be specific to variants, batches or individual boats and help us to identify individual boats or batches from photographs. The third table provides a summary of radar and radar warning equipment and has not been presented previously.

In the tables, the code in the second column refers to the following -

- F - fitting for first time
- D - deletion (complete removal with nothing being added in its place)
- R - replacing with an alternative item or upgrading of existing equipment

Modifications

Modifications to Type IXs					
Feature	**F, D or R**	**Order date**	**Tested**	**To op. boats**	**Other information**
Net cutters	F / D	-	-	Usually 39	Removed then re-installed pre-war; straight or serrated
Spray deflector	F	-	-	39 (before war)	Added before wind deflector
Wind deflector	F	-	-	Late 39	-
Large white tower U-numbers	D	-	-	19/08/39	Painted over prior to hostilities
Oval plates at bow	D	-	-	19/08/39	-
Bronze eagle plaque on tower	D	-	-	19/08/39	-
Red horseshoe lifebelts on tower	-	-	-	19/08/39	Lifebelts retained but white text removed
Red / white lifebuoys on deck	-	-	-	19/08/39	Painted black
Seven extra tower rungs per side	F	-	-	Late 39 or early 40	Added to early IXAs.
Intake W to X	R	-	-	Early war	All by summer 40; U 38 prior to war
Railing from R1 to R2	R	-	-	Early war	IXAs only
Deck railings extended	R	-	-	Early 40	Different styles, multiple changes
Hull breakwaters	F	-	-	Spring 40	Not universal
Waterproof 20mm	F	-	-	Spring 40	Operational first
Deck breakwaters	F	-	-	40	Not universal; variable lengths
Black deck lifebuoys	D	-	-	40	-
Foldable metal seats	R	-	-	40	4 on bulwark; 2 on periscope housing
Ledge on bulwark and periscope housing	F	-	-	40	Replaced foldable seats
Inside rear of starboard side of tower	R	-	-	Summer 40	Along with intake style X replacing W
Anti-vibration wires to periscopes	F	-	-	Autumn 40	Usually on both periscopes
37mm semi-automatic on aft deck	F	-	-	Usually Dec 40 - May 41	-
Extra railings around 37mm semi-automatic	F	-	-	Early 41	-
20mm on aft deck	F	-	-	Early 41	On some boats; usually replaced by 37mm
S-Gerät bow device	F	11/10/40	-	After order	Not universal
Hull fairleads	F	-	-	Early 41	Not universal; two positions
Net cutters	D	01/03/41	-	Spring 41	Serrated or straight

Windscreen and base plate	F	-	-	Late 40 / early 41	Some had alternate metal version
Mountings on tower for removable machine guns	F	27/07/42	-	Spring 41	2 or 4 machine guns
Deck breakwaters	D	21/05/41	-	Summer 41	-
Wooden panelling on tower bulwark	F	24/07/41	-	Autumn 41	Later boats had narrower panelling
Wooden strips to UZO and periscope bases	F	06/12/41	-	After order	-
S-Gerät bow device	D	24/04/42	-	After order	-
Hull breakwaters	D	-	-	First half of 42	-
Drainage holes below hull breakwaters	D	-	-	Spring 42	No longer fitted to new build boats
KDB	D	24/04/42	-	After order	-
Simplified grills on deck	F	-	-	Early 42	On new build boats
Lookout mast on aft deck	F	-	-	Spring / summer 42	On U 183, U 184, U 185 and U 187 only; shortened early 43
Rockets	F	-	May 42	May 42	U 511 only
Extendable support ring	F	-	-	Summer 42	-
Monsun platform	F	-	-	Summer 42	On Far East boats
Compass repeater behind attack periscope	D	-	-	Autumn 42	-
Askania magnetic compass fairing	F	15/10/42	-	Autumn 42	On new boats only; summer 42 on *Seebeckwerft* boats
Extendable rod aerial	D	19/10/42	-	After order	Replaced by radar box
Bold decoys	F	-	-	42 or early 43	Bold 4 introduced 44
Change of slotted deck to planked deck	F	-	-	Latter half of 42	Usually on new built boats only
37mm automatic on aft deck	R	-	-	Late 42	Replaced 20mm on some boats
Turm II	R	-	-	Dec 42	Replaced Turm 0; 1 * 20mm upper + 1 * 20mm lower
Reversed jumping wires	F	-	-	Dec 42	On a few boats with Turm II
Radar box	F	-	-	Dec 42 / early 43	-
Bachstelze	F	-	Aug 42	Early 43	3 pressure proof containers on IXD towers
Armoured plate	F	-	-	First half of 43	Thicker plate added later
Armoured doors	F	-	-	First half of 43	-
37mm automatic on aft deck	D	-	-	Spring / summer 43	Some retained with Turm II; deleted when Turm IV fitted
New UZO	R	-	-	Spring 43	-
Turm IV	R	14/11/42	-	Spring 43	Replaced Turm II;

					2 * twin 20mm upper + 1 * Vierling lower (later 37mm lower)
Vierling	F	-	Mar 43	Spring 43	Lower platform
Reduced insulators	D	-	-	Spring 43	Forward jumping wires
Aft deck tall support posts	F	-	-	Spring 43 to early 44	On some new build boats; discontinued after early 44
Outward facing tripods	R	-	-	43 onwards	On some boats
Lookout mast on aft deck	D	-	-	May 43	From U 183 and U 185
Armoured boxes (coal scuttles)	F	04/06/43	-	Summer / autumn 43	-
Underwater refuelling	F	-	-	Late 43	Initially on new built boats; later on existing boats; not universal
37mm automatic	F	15/10/43	-	Nov 43	Replaced Vierling
105mm deck gun on forward deck	D	27/04/43	-	Latter half of 43 / early 44	Retained on long range IXs
Anti-slip strips around deck gun	D	27/04/43	-	Latter half of 43 / early 44	Removed with deck gun
Base plate for deck gun	D	27/04/43	-	Latter half of 43 / early 44	Removed with deck gun
Armoured boxes (coal scuttles)	D	30/10/43	-	Late 43 / early 44	-
Balcongerät	F	-	Jan 43	Late 43 onwards	Not universal
Dive plane wires	D	-	-	43 or early 44	-
A-shaped bracket on bottom of rudders	D	-	-	43 or early 44	-
Schnorchel (ball float valve)	F	-	Aug / Sep 43	Jan 44 onwards	-
Tarnmatte	F	-	-	Jan 44 onwards	To *schnorchel* heads
Extra railing bars	F	-	-	Early 44	Top end lower platform
Overhead railing bars	F	-	-	Early 44	Top end lower platform
Lattice mesh	F	-	-	First half of 44	To some railings
New direction-finding loop	R	-	-	Spring 44 to late autumn 44	-
Fast dive foredeck (*Schnelltauchback*)	F	-	Mar 44	Aug 44	Not universal
Torpedo trolley rails	F	-	-	Aug 44	Fitted with fast dive foredeck
Twin 37mm automatic	R	-	-	Late 44 / early 45	Replaced 37mm automatic on some boats
Side cushions	F	-	-	Late war	On only a few boats
Spare barrel containers	F	-	-	Late war	Some boats only
Liferaft containers on foredeck	F	-	-	Late war	Some boats only
Rescue dinghy containers	F	-	-	Late war	Some boats only
Round watertight hatch on starboard foredeck	R	-	-	Late war	-

Exhaust outlet moved below waterline	R	-	-	Late war	Unbroken line of vents
Zweibel	F	-	-	Late war	U 889 only
Schnorchel (ring float valve)	R	-	Sep 44	Jan 45	Replaced ball float valve version

Identification features

Identification features of Type IXs										
Feature	**U 37, U 38, U 39**	**U 40**	**U 41, U 42, U 43, U 44**	**U 64, U 65**	**U 122, U 123, U 124**	**U 103**	**U 104**	**U 105, U 106, U 107**	**U 108, U 109, U 110, U 111**	**IXC, IXDs**
Long spray deflector	Y	N	N	N	N	N	N	N	N	N
Air intake W	Y	Y	Y	Y	Y	N	N	N	N	N
Air intake X	Y	Y	Y	Y	Y	N	N	N	N	N
Air intake Y (single on port side)	N	N	N	N	N	Y	Y	Y	N	N
Air intake Y (triple on port side)	N	N	N	N	N	N	N	N	Y	N
Air intake Z1 to Z4	N	N	N	N	N	N	N	N	N	Y
Railing style R1 (pre-war)	Y	Y	Y	N	N	N	N	N	N	N
Railing style R2 (wartime)	Y	Y	Y	N	N	N	N	N	N	N
Railing style R3	N	N	N	Y	Y	Y	N	N	N	N
Railing style R4	N	N	N	N	N	N	Y	Y	Y	Y
Inside rear of starboard tower side	Y	Y	Y	Y	Y	N	N	N	N	N
Foldable metal seats	Y	Y	Y	Y	Y	N	N	N	N	N
Semi-circular bar at top of rear on periscope housing	Y	Y	Y	Y	Y	N	N	N	N	N
Extendable rod aerial	N	N	N	N	N	N	N	N	Y	Y
Side intakes starboard side 1940	-	-	-	2/4	2/4	3	3	3	3	3
Side intakes starboard side 1941	-	-	-	2	2	3	3	3	3	3
Side intakes port side 1940	-	-	-	2/4	2/4	2	2	2	2	2
Side intakes on port side 1941	-	-	-	2	2	2	2	2	2	2
Door with marker on port	N	N	N	N	N	Y	Y	Y	Y	Y
Two lines below tower hatch	N	N	N	N	Y	Y	Y	Y	Y	Y
Rear tower railing	Y	Y	Y	Y	Y	N	N	N	N	N
Long wind deflector*	Y	N	N/Y	N	N	N	N	N	N	N
Short wind deflector (taper to point)	N	N	N	Y	Y	Y	Y	Y	Y	Y
Long wind deflector (taper to point)	N	N	N	N	N	N	N	N	N	Y
Navigation light hood - none	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Navigation light hood - single	N	N	N	N	N	N	N	N	N	Y
Navigation light hood - double	N	N	N	N	N	N	N	N	N	Y
Jumping wire point 1	Y	Y	Y	Y	Y	Y	N	N	N	N
Jumping wire point 2**	N	N	N	N	N	N	Y	Y	Y	N
Jumping wire point 3	N	N	N	N	N	N	N	N	N	Y
Bendy bar on periscope base	Y	Y	Y	Y	Y***	N	N	N	N	N
Mystery object	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Third periscope	Y	Y	Y	Y	Y	Y?	Y?	Y?	Y?	N
Access hatch behind deck gun	Y	Y	Y	N	N	N	N	N	N	N
Single bow vent on port side	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
One bow vent plus extra at stem	Y	Y	Y	Y	Y	Y	Y	Y	Y	N

on starboard side										
Two bow vents per side	N	N	N	N	N	N	N	N	N	Y
Forward footholes over vent 11	Y	Y	Y	N	N	N	N	N	N	N
Forward footholes over vent 8****	N	N	N	Y	Y	Y	Y	Y	Y	Y
Rear foothole over middle of vent 21	Y	Y	N	N	N	N	N	N	N	N
Rear foothole over rear of vent 20	N	N	Y	Y	N	N	N	N	N	N
Rear foothole over front of vent 21	N	N	N	N	N	N	N	N	N	Y
Deck railings 4S	Y	Y	Y	N	N	N	N	N	N	N
Deck railings 8S*****	N	N	N	Y	Y	Y	Y	Y	Y	N

* U 43 had a long wind deflector
** U 109 had attachment point 3; U 105 had both 2 and 3
*** U 123 had the bendy bar when commissioned but this was removed very soon afterwards
**** *Seebeckwerft* boats had no forward footholes
***** U 123 had unique railings; U 66, U 67 and U 68 all originally had 8S

Radar and radar warning

Summary of radar and radar warning on Type IXs		
Antenna	**Introduced**	**Removal**
FuMB *Berta*	Late 41	May 42
FuMO 29 *Seetakt*	1942	1943
FuMB 1 *Metox*	Aug 42	Aug 43
FuMB Ant 2 *Honduras* (Biscay Cross)	Aug 42	Carried as spare
FuMO 30 *Seetakt*	Early 43	Early 44
FuMT 1 *Aphrodite*	Spring 43	-
FuMB Ant 3 *Bali I*	Apr / May 43	Not removed
FuMB 4 *Samos*	Apr / May 43	-
FuMB Ant 5 *Samoa*	Late 43	-
FuMB 7 *Naxos*	Oct 43	-
FuMB 8 *Wanze* G1	Aug 43	Early Nov 43
FuMB 9 *Wanze* G2	Late Nov 43	-
FuMB 10 *Borkum*	Nov 43	-
FuMB Ant 11 *Finger*	Oct 43	-
FuMB Ant 24 Cuba 1 *Fliege*	Feb 44	-
FuMB Ant 24 Cuba II *Mücke*	Before Jun 44	-
FuMO 61 *Hohentweil-U*	Mar 44	Not removed
FuMB 26 *Tunis*	May 44	Not removed
FuMB 28 *Naxos* ZM4	Aug 44	-

Part XV - Acknowlegements, References & Photo Sources

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- Jerry Mason for the interrogation reports on his website uboatarchive.net.

Further reading

The following AMP articles provide additional details that will be of interest to IX modellers -

Type VII U-Boat Modifications
U 505: Modifications, Colours & Insignia
List Of U-Boat Modifications & Identification Features

Recommended reading

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