

450lb Armour Piercing Bomb

In 1921 preliminary a sketch of 750lb, 11" in diameter armour piercing bomb had been completed, this was sent to various manufacturers for their opinions and estimates of the cost of the bomb. Several modifications were proposed, most of which involved an almost complete redesign of the bomb so in March 1922 a meeting was held at the Ordnance Committee Office to discuss the design of the bomb. The size of the bomb that could be carried had not been settled but it was necessary to limit the weight of armour piercing bombs to 500lbs and so it was decided that a smaller bomb should be designed which was suitable for firing from a 9.2" gun against hardened steel plates. The 750lb design was reduced to around 439lb in weight.

No consideration had yet been made to the tail of the bomb as the primary object had been the creation of a projectile that could perforate, undamaged, 3" hardened steel plate with a striking velocity of 700 feet per second when fired from a gun. Three sketch designs of the bomb were completed in April 1922, charge to weight ratio was 6%, 13% and 19%. The bomb with 19% charge to weight ration was only shown for comparison as it would not have been strong enough. Six bombs of 13% charge to weight ratio were ordered for firing trials as well as eight each of the 13% and 6% bombs for fragmentation bombs.

Bombs of this type had not been fired from a gun before and so the six 13% bombs were to be fired first to make sure they could stand up to the acceleration forces in the gun and be steady in flight. The trials were successfully completed in December 1922 and the bombs were undamaged. The bombs were then made ready for firing trials against 3" steel plates. The first was successfully fired in May 1923 with a striking velocity of 699 feet per second at 60 yards. The projectile successfully perforated the plate as was undamaged. The first fragmentation trials were also completed in May and it was found that the 13% bomb was significantly more effective in both penetration and fragments than the 6% bomb. Development from then on was confined to the 13% bomb.

In June 1923 the best type of explosive was considered, these were Shellite, TNT and 80/20 Amatol. In July a meeting was held to discuss future development trials of the bomb. The following was agreed upon...

1. The firing trials were to be repeated against 3" steel plate at 700 feet per second and 1000 feet per second but at 20 degrees to the normal.
2. If these were successful trials with 3/4" steel plates in front of 3" plates at intervals of about 8 feet to represent the upper and main decks of a capital ship with an angle of attack of 20 degrees should be carried out.
3. TNT was the most promising filling and would probably be

adopted in the absence of further information

4. Tail fuzeing was required with the ability to have a "delay of 30 feet in a 439lb bomb fired at 3/4" steel plate with a striking velocity of 700 feet per second". With the usual safety requirements.

The trials in (1) were concluded successfully and in November 1923 two bombs were fired in accordance to (2), both these bombs perforated all the steel plates successfully and were recovered whole. As these trials had been completed successfully it was decided to trial the bombs against 4" steel plate, 20 degrees at 1000 feet per second and if successful 700 feet per second and if that was successfully 600 feet per second (i.e. a drop from 6000 feet).

In March 1924 a design for the tail unit was put forward, this was not liked and many alterations were proposed. In July and August 1924 the trials against the 4" plate were completed, at 1000 feet per second the bomb was successful but at 700 feet per second the bomb only penetrated the 4" plate and then rebounded whole. By October the tail unit design was agreed upon and twenty experimental bombs had been manufactured.

In November 1925 the bomb had been tested ballistically and

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was found to be satisfactory. It was then decided to accept the bomb in its present state without any more trials and Woolwich was asked to prepare complete designs for approval. The bomb was also to be called a 450lb bomb despite weighing 439lb, this was to enable aircraft loads to be worked out more readily and allow for a reasonable high limit for weight to be worked out without any chance of the total specified load of the aircraft being exceeded.

The reason for no further trials was due to the Admiralty stepping up requirements for an armour piercing bomb considerably. Performance against 7" steel plate was required and so a much larger bomb was needed (1500lb) and the 450lb design was available in case of emergency.

In October 1927 small orders were placed with manufacturing firms so that manufacturing difficulties could be overcome. In February 1931 two bombs were ordered for ship bombing trials and in February 1932 trials against the HMS Marlborough were completed, a bomb was detonated at rest and it was found that the bust effect was not much different from the 500lb SAP bomb but fragmentation was better. In July 1932 it was decided not to order any more 450lb armour piercing bombs.

Weight
439lb
CV 3%

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Sources - AVIA 46 285, AVIA 46 163