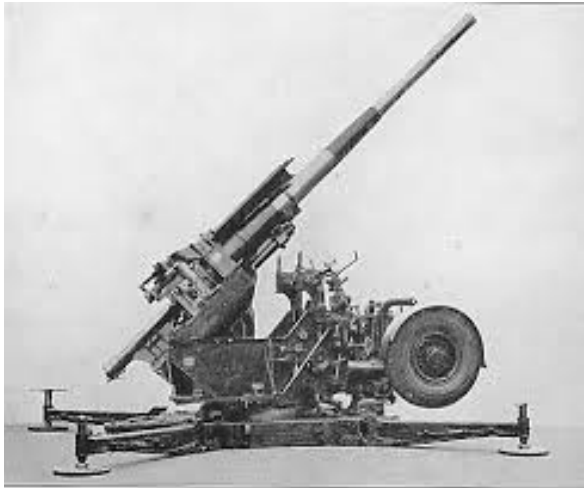


The 3.7 Inch AA Gun in Ground Defence



The British Ordnance QF 3.7-inch AA gun (*left*), while primarily designed for high-altitude air defence, saw increasing use in various ground roles—including field artillery, counter-battery fire, and occasional anti-tank actions—particularly during the latter half of World War II. While it shared similar performance characteristics with the famous German 88mm gun, its use in the ground role was initially limited by its significant weight, a lack of appropriate direct-fire sights, and a rigid British doctrine that prioritised its use as a rare and valuable air-defence asset.

While the **QF 3.7-inch AA gun** was arguably superior in raw power to the German 88mm, several technical, doctrinal, and logistical reasons prevented Britain from using it in a regular anti-tank role.

1. Technical Limitations

The 3.7-inch gun was not designed for the stresses of ground combat:

Weight and Mobility: It weighed approximately **9.3 tons**, making it about two tons heavier than the German 88mm. This made it extremely difficult to move, conceal, or rapidly deploy in the fluid desert warfare of North Africa.

Mounting Issues: Unlike the German 88, which could be fired while still on its wheels in an emergency, the 3.7-inch usually had to be fully unlimbered and mounted on its pedestal to fire safely.

Recoil and Sights: Firing at low elevations caused excessive strain on its recuperator (recoil mechanism), leading to frequent breakdowns. Furthermore, the Gunner's Position often faced away from the target because it was designed to receive coordinates from a remote "Predictor" computer rather than using direct optical sights. There was a lack of appropriate direct fire sights.

2. Differing Doctrines

The British and Germans viewed anti-aircraft assets very differently:

Asset Control: In the British Army, heavy AA guns were Corps or Army assets, controlled by high-level headquarters for defending strategic rear-area targets. The Germans often devolved control of 88s to divisional commanders who could push them directly into the front lines.

"Tactic of Desperation": Historians often note that the Germans used the 88 against tanks because their standard anti-tank guns (like the 37mm "Doorknocker") were initially inadequate against heavy Allied armour. Conversely, Britain's 2-pounder and later 6-pounder guns were generally effective enough that there was no "desperate" need to risk the expensive 3.7-inch guns in frontline combat.

3. Logistical Scarcity

The 3.7-inch gun was a highly sophisticated and expensive piece of equipment. Britain faced a perpetual shortage of heavy AA guns for their primary role: defending cities and ports from the Luftwaffe. Losing these rare, high-value assets to ground fire or capture was seen as a strategic risk the British command was unwilling to take.

Despite these factors, the 3.7-inch **was** used as a tank-buster in rare emergencies, most notably at the Siege of Tobruk in 1942, where they successfully held off German panzers for several hours.

While the QF 3.7-inch anti-aircraft gun was often restricted in the field, its immense power was eventually harnessed for the A39 Tortoise Heavy Assault Tank.

The Evolution into the 32-Pounder

The 3.7-inch AA gun's barrel design was adapted into the **Ordnance QF 32-pounder**, which became the most powerful British anti-tank gun of the war.

- **Increased Power:** The original 3.7-inch fired a 28lb shell; the 32-pounder used a heavier **32lb (14.5 kg)** armour-piercing shot.
- **Extreme Velocity:** It achieved a muzzle velocity of **3,050 ft/s**, while specialized "Sabot" (APDS) rounds reached an incredible **5,050 ft/s**, allowing it to penetrate even the heaviest German armour, including the **Tiger II**, from long ranges.
- **Specialised Rifling:** Late versions used "gradual rifling" to reduce barrel wear and air resistance, ensuring high accuracy.

The A39 Tortoise

Designed to breach the heavily fortified **Siegfried Line**, the Tortoise was more of a "mobile fortress" than a traditional tank.

Enormous Scale: It weighed approximately **78–80 tons** and was protected by armour up to **225mm thick** at the front.

Unique Mounting: To handle the massive gun, it used a **power-assisted ball mount** rather than a traditional turret, giving it limited horizontal traverse.

Interior Space: The vehicle was so large that it required a **7-man crew** (including two loaders just to handle the heavy ammunition).

"Operation Crusader" November 1941 (from the "Crusader Project").

It should be noted that the Germans did not have a "free lunch" either. Using (and losing) their precious 88mm guns in tank defence weakened the ability of the artillery arm to provide in-depth air defence over logistics centres, and thus allowed the Royal Air Force far more freedom in attacking bases such as Benghazi, Derna, and Tripoli. However, this strategic aspect might not have been overly appreciated by British tank crews at the time!

Regardless, it is likely that most damage on British tanks inflicted by Axis AT guns was by 50mm PAK38 and Italian 47mm Boehler guns, which were far more numerous, more mobile, and easier to camouflage.

Considerations

The reality was that the British 3.7" guns, usually, weren't anywhere near the ground fighting and that the British army valued air defence over ground defence for these guns. Apart from that, it is also often overlooked that the 3.7" gun was much heavier and bulkier, and not designed for a mobile multi-role use, unlike the 88mm.

There are also doctrinal questions, e.g. whether AA gun formations were trained to work closely with the tanks, and able to make much of a difference, and whether the specialized equipment needed was present (e.g. the Germans used a half-tracked prime mover for the 88, giving it more off-road mobility – Empire forces did not have such vehicles).

What is clear from the document below is that the 3.7" gun did serve in the ground role, and that it was considered a specialized asset to be used for specific tasks, rather than general shelling of enemy positions. Like the 88, it had a very good range, and presumably the ability to generate airbursts through the use of timed fuses. These are valuable in counter battery work, and (as noted below) when engaging planes operating on an enemy airfield within range.

Documentary Evidence

In order to lay to rest the myth that the 3.7" gun was not allowed to be used in the ground role or wasn't used as such until much later in the war, here is an excerpt from an 8th Army, "Lessons Learned" document, published after Operation CRUSADER.

Tobruk was of course a special case. For one, mobility did not matter as much, since it was a siege. The field gunners and AA gunners worked cheek-by-jowl, making cooperation much easier, under a Fortress command. The defended area was small, meaning that guns could be located to be able to be effective in both air and ground work.

Abbreviations

AA/A.A. – anti-aircraft

A.Tk – anti-tank

Comd – Commander

M.E.F. – Middle East Forces

'EMPLOYMENT OF AA ARTILLERY AGAINST GROUND TARGETS

The Comd 70 Division reports from TOBRUCH [Tobruk] that on many occasions during recent operations, 3.7 AA guns were used against ground targets, notably the EL ADEM aerodrome when enemy aeroplanes were seen landing. They were also used for engaging enemy movement, and for counter battery at ranges beyond that of normal artillery, and for night harassing of roads.

Results were very effective. The guns were very accurate, and fragmentation was excellent. Fuzes were set at safety, and no unexploded round was found on subsequent examination of the areas.

Owing to their high rate of fire, these guns were invaluable for use, in conjunction with others, on one minute area shoots on centres of hostile action.

It is interesting to note that in the German instructions for the defence of the HALFAYA position against Tank attacks, all AA guns were given an A.Tk role while Small Arms fire was to be used against attacking aircraft.

The following points however must influence the use of AA weapons in roles other than A.A.:-

- (i) Effective A.Tk range of 40mm shot is 500 yds.
- (ii) AA ammunition stocks in M.E.F. are not unlimited.
- (iii) Carriages are conspicuous targets in field operations and must be carefully camouflaged.'



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3.7" gun near Tobruk, August 1941

Examples of 3.7-inch AA Guns in Ground Roles:

North African Campaign (Tobruk/Alamein): In June 1942, guns from the 68th HAA Regiment engaged an armoured battalion for four hours, destroying four tanks. They also fired on El Adem aerodrome to disrupt enemy air activity and engaged in counter-battery, firing at long ranges. In the **El Alamein** line, shortly after the fall of Tobruk, four 3.7-inch guns engaged a German column, destroying vehicles, 8.8cm guns, and tanks.

Italy and North-West Europe: During the latter half of the war, these guns were used for harassing, counter-battery, and counter-mortar fire. In Italy and North-West Europe, the 3.7-inch gun's high velocity made it a popular "concrete buster" alongside weapons like the 17-pounder and the 155mm "Long Tom". Units from the 24th and 25th Heavy Anti-Aircraft (HAA) Batteries supported the US 34th Division during the advance to the Arno River. Their performance was so effective—including knocking out a stubborn machine gun position with a single airburst round—that US units formally commended them. During the siege of Dunkirk in 1944, Canadian gunners utilized the 3.7-inch gun as field artillery. In early 1945, during Operations Veritable and Plunder (the Rhine crossing), HAA regiments were fully integrated into corps-level indirect fire plans.

Australian Service (Tarakan, 1945): 3.7-inch guns were employed to fire on Japanese-entrenched positions on the "Margy" feature.

Burma: During the Battle of the Admin Box in February 1944, the 8th Belfast HAA Regiment used their guns to fire into barrages and engage Japanese infantry guns on hillsides.

Defence of Britain: Gun positions were set up to defend against potential ground attacks by tanks or parachutists.

Emergency Anti-Tank Use: In 1940, 3.7-inch guns were used to engage German tanks in France.

Post-War Ground Use

Malayan Emergency: The guns were used with some success, although they frequently suffered from broken recoil springs when fired horizontally over long periods.

Nepal: As of late 2021, the Nepalese Army reportedly still had 45 of these guns in service.

The Ordnance QF 32-Pounder

Directly adapted from the 3.7-inch AA gun, the Ordnance QF 32-pounder was designed to surpass the 17-pounder in anti-tank performance. It used a 94mm bore and separate-loading ammunition (shell and propellant loaded separately).

A39 Tortoise Heavy Assault Tank (below): This 78-ton "castle on tracks" was the primary platform for the 32-pounder. In 1948 trials, it successfully penetrated a German Panther's frontal armour at **950 yards** and caused "considerable fragmentation" inside the turret at **1,350 yards**.



Other adaptations of the 3.7" gun

Towed 32-Pounder Anti-Tank Gun: At least one experimental version was developed as a wheeled anti-tank gun. However, at a weight of roughly 10 tons, it was deemed too impractical to manhandle into concealed positions.

Experimental APDS Rounds: Though they never saw service, tests in 1946 with Armour-Piercing Discarding Sabot (APDS) rounds reached a staggering muzzle velocity of **5,050 ft/s**, capable of penetrating 200mm of sloped plate.

Other Experimental Platforms

Beyond the Tortoise, several other attempts were made to "ground" the 3.7-inch gun:

Ram Tank (Canada): Designers experimented with mounting the 3.7-inch AA gun directly onto a Ram tank chassis (*below*). The result was considered too unwieldy and never entered production.



TOG 2: An experimental derivative known as the **28-pounder** was fitted to the TOG 2 super-heavy tank (*below*). This project was terminated.



De Havilland Mosquito: In a highly unusual move, the 32-pounder was trialled as a fixed aircraft weapon in a single Mosquito fighter-bomber (*below*).

