

A Technical Examination of the Main Armament of the French Char B1 bis Tank, the Best Armed Series-Produced Tank in Service in 1939

William S Andrews, PhD, PEng
Professor
Chemistry and Chemical Engineering
Royal Military College of Canada
Kingston ON Canada K7K 7B4
phone: +1 613 541 6000 x 6052

Up until the end of World War I, over 7000 tanks were built, primarily by Britain and France. The cannon of these vehicles were hull mounted (except for the French FT light tank) to be used against soldiers and field defences. With the end of hostilities, design work progressed to include tanks as potential targets, both for infantry antitank guns and for armament on tanks. In fact, the former generally preceded the latter, so guns, mounted in tanks, that were designed and fielded during the inter war period were often derivations of antitank guns. Examples of this are the German 3.7cm KwK35/36 L/46.5, which was adapted from the PaK35/36 L/45 for mounting into the early models of the Panzerkampfwagen III, and the British 40 mm Ordnance QF 2 Pounder mounted on cruiser and infantry tanks, such as the A-9, A-10, A-13 and Mk II.

During the inter war period of 1918 to 1939, the number of tank-producing nations grew, with the Soviet Union, Japan, Italy and Germany, among others, designing and building their own tanks. This notwithstanding, the vast majority of these were what could be considered light tanks (arbitrarily under 15 T) armed with either machine guns or small (20-40 mm) cannon. The number of medium tanks (again somewhat arbitrarily 15-45 T) was much smaller. Of this latter category, arguably the best armed, series-produced tank of the period was the French Char B1 bis. The mammoth Soviet T-35 was only produced in very limited numbers (61), while the much more numerous T-28 (503) had a single main armament (a short 76.2 mm cannon). By comparison, the B1 bis was armed with two cannon (75 mm and 47 mm) and was also produced in significant numbers (369).

This presentation will describe in detail these two gunnery systems, in terms of barrel, breech design, recoil system, firing mechanism, gun controls, sights, crew servicing, ammunition and recoil load. The larger of the two guns was the hull-mounted 75 mm SA35 L/17.1, i.e., semi automatic model 1935, having a barrel length of 17.1 calibres. It fired two principal types of 75x241R (rimmed casing of 241 mm length) rounds - armour piercing (*obus de rupture*), which contained a small bursting charge, and high explosive (*obus explosif*). The projectiles had weights of about 6 kg and muzzle velocities of about 500 m/s.

The other cannon was the turret-mounted 47 mm SA35 L/32, that fired 47x193R mm high explosive (1.4 kg projectile) and armour piercing capped (1.6 kg) rounds at muzzle velocities of up to 680 m/s. This gun was, it will be argued, the best tank-mounted anti-tank cannon in 1939.

These two gun systems had their effectiveness limited significantly by the choices made by the vehicle designers in allocating crew duties. The 75 mm gun was aimed and fired by the driver,

with lateral aiming accomplished by having to align the vehicle hull, as the gun was fixed within the hull in azimuth. The 47 mm gun was aimed, loaded and fired by the vehicle commander, in his one-man revolving APX-4 turret. These limitations notwithstanding, the B1 bis was of sufficient quality that it continued in use by the conquering German forces, in a number of capacities, until the end of the war in 1945.

Of interest, as well, is the fact that the B1 bis was the last French tank to feature a hull-mounted cannon, and was only followed, in this regard, by the US M3 Medium Tank (in both Lee and Grant configurations) and the British Churchill Mk I. All other tanks of the period that mounted cannon (as opposed to just machine guns) did so in fully-revolving turrets. Although the best armed tank of its time, then, the B1 bis was probably not the most effective, and presaged the transition to turret-mounted cannon in subsequent tank designs worldwide.

Key words: Char B1 bis, tank cannon, pre-World War II

Word count: 700