All Infantry Squads are not Created Equal

The Effect of Squad Automatics on an Infantry Squad's Overall Firepower

It is still sometimes stated that the German army had better equipment (especially tanks and artillery) than the enemy armies it faced, particularly in the early years of WWII. In regards to most weapons (especially tanks and artillery) this statement is simply not true. However, in regard to light and medium machine guns it is true, and this situation remained essentially unchanged for the duration of the war. Ironically many German weapons are often touted as being potential war winners, or at least far ahead of anything fielded by the Western Allies or the USSR in WWII. These weapons include the famous (or infamous) King Tiger tanks, the V2 rocket, the type XXI U-boat and the Me 262 jet fighter-bomber. In the rush to marvel at these weapons, most historians have overlooked a weapon which inflicted far more casualties on the Wehrmacht's enemies than all the so called 'wonder weapons' combined, and which took the Allies until the 1950s to produce a comparable weapon. This was the MG 34 machine gun, followed by the even more lethal MG 42 machine gun.

The standard German machine gun in 1941 was the 7.92mm MG 34. The MG 34 was the world's first General Purpose Machine Gun (GPMG), a term that is standard in today's armies but was unknown in 1939. The MG 34 was the first true GPMG because it was used as the standard infantry squad automatic (on a bipod) as well as the platoon or company's MMG-HMGs (on a tripod). It even had a respectable anti-aircraft (AA) capability due to its very high rate of fire (900 rounds per minute), accuracy and ammunition feed. The origins of the MG 34 go back to 1930 when the Swiss company of Solothurn produced a MG called the MG 30 which they offered to the German Army.[1] The MG 30 was a very advanced design and was probably the first 'straight line' MG design. It incorporated a butt in prolongation with the barrel axis and an ingenious quick change barrel design, both features of the MG 34. However the German Army was not impressed with the weapon and asked Mauserwerke (Mauser) to improve on its design. Mauserwerke jettisoned the side feeding box magazine and designed a new belt feed mechanism which could also take the saddle drum magazine used on the MG 15. The bolt locking system, the recoil system, and the barrel changing system were also all redesigned. The resultant MG34 was immediately accepted by the German Army for two main reasons: it was technically the finest weapon in its class in the world, and more importantly it fit in with the German Army's infantry squad tactics which had been continually developed during and after WWI.

The most far reaching impact of the MG 34 was tactical rather than mechanical. To understand this very important fact, we need to digress slightly and examine in simple terms how infantry squads worked in combat during this period. The infantry squad was essentially the smallest self-contained manoeuvre unit on the battlefield. It was capable of independent action and had both the structure and morale to be sent into action unsupported. The typical infantry squad of 8-12 men and could be separated into four functional parts. These were: command section (the squad leader), communication section (radio if available, which they weren't in the Red Army), heavy weapons section (LMGs, automatic rifles, heavy AT weapons) and assault section (rifles, SMGs, grenades, flamethrowers, light AT weapons). The assault section (also often called the rifle section) was usually the largest section in the squad, with the 'command' and 'communication' sections also part of this group when the situation required. In general terms the infantry squad operated as follows. In offensive situations the heavy weapons section was expected to cover and suppress the enemy's firepower, enabling the assault section to close and neutralise the enemy position. In defence the heavy weapons section was expected to provide the bulk of the firepower needed to eliminate the enemy attack, with the assault section protecting the flanks of the main defence.

To fulfil these requirements, the ideal squad MG had to be: light enough to be carried forward by one man to directly support an attack, able to be brought into action within less than a minute, easily concealed, operated by one or two men at most, have adequate firepower (rate of fire, ammunition feed and accuracy) to suppress and inflict damage on the enemy defences, and be able to maintain a sustained fire for a long period (i.e. have adequate barrel cooling and be reliable). Like many technical specifications, the squad MG was a trade-off between conflicting requirements. Traditionally in MG design, 'adequate firepower', 'cooling' and 'sustained fire' meant belt fed ammunition and some form of assisted cooling such as water. These in turn meant the weapon was very heavy (far too heavy to be carried forward), difficult to conceal and slow into action. In addition, the voracious appetite for ammunition of automatic weapons meant the squad MG required an ammunition system which other members of the squad could support; specifically they could carry some of the required ammunition forward in support of the MG team.

[1] The German Rheinmettal Company set up Waffenfabrik Solothurn AG as a subsidiary company in Switzerland in 1929. Solothurn was to act as their proof and experimental unit for designs which could not be produced in Germany. I. V. Hogg, Infantry Weapons of WWII, Saturn Books Ltd, London, 1997, p. 85.

The result was that every other army (except the German Army) opted for air cooled and magazine fed designs, which collectively became known as light machine guns (LMGs). It was felt that the LMG could still provide adequate firepower to 'do the job' and there was essentially no choice anyway. It was simply impractical to have anything but air cooled barrels and it was felt that having squad members festooned with ammunition belts was unworkable. Separate ammunition magazines (with 20-30 rounds each) could be carried by all squad members, and the resultant limitations on fire rate, coupled with a LMG designed to fire 400-600 rounds per minute, meant the cooling problem could be managed. The US army didn't even opt for the LMG as the standard squad automatic in the interwar years. Instead they opted for the Browning automatic rifle (BAR) M1918A2. This was essentially a heavy automatic rifle with a bottom loading 20 round magazine (which is inconvenient to change in action) and an extremely violent action. At 10kg in weight, the BAR was as heavy as contemporary LMGs without the flexibility and firepower advantages of most current LMGs. Amazingly, the BAR remained the US army's squad light automatic until after WWII.

Unfortunately for the rest of the world, the LMG compromise did not satisfy the German Army's tactical combat requirements in the interwar years. Ever since the development of 'shock troop tactics' by the German Army in WWI, the Germans (along with some other armies) had struggled to find a MG which could meet all the demands required of a modern squad MG.[2] They decided to pursue the concept of the General Purpose Machine Gun (GPMG); a weapon capable of meeting the demands of the squad LMG and also powerful enough to equip the heavy MG platoons and companies. Firstly, they ignored the idea that having squad members festooned with ammunition belts was unworkable. As it turned out this was true, and I am often amused to see modern day infantry squads with belt ammunition draped over their shoulders on newsreels and photos! Secondly, the problem of cooling was solved by using a perforated air cooled barrel and more importantly, an ingenious and very rapid barrel changing system. Barrel changing was simplified by hinging the gun body to the rear end of the barrel casing; unlatching allowed the gun body to be swung sideways and the barrel pulled straight out of its bearings. In action, a good crew could change the barrel in 5-10 seconds! Finally, the Germans kept the MG 34 light enough to be carried and brought into action by one man. With a bipod attached to the barrel (standard in LMGs) the MG 34 weighed 12.2 kg. This is only marginally heavier than the outstanding British Bren LMG at 10.1 kg, the Red Army's DP 1928 LMG at 9.3 kg, and the US Army's BAR at 10 kg.[3]

If the MG 34 was required to fulfil the role of MMG (Medium MG) or even HMG (Heavy MG), it was fitted to a small tripod (weighing 6.75 kg) or more commonly a large tripod (weighing 23.6 kg). The large tripod incorporated a sprung cradle to reduce the recoil and vibration, and the facility for telescopic gun sights and remote firing capability on a fixed arc. On the large tripod, the MG 34 was effective out to 2 500-3 000 metres. Coupled with the much higher rate of fire, this meant that the MG 34 also outperformed most contemporary WWII HMGs. The only real weakness of the MG 34 was that it was too good! The quality of design and workmanship meant long and precise manufacturing processes, and the weapon was very expensive for a squad weapon. As WWII progressed MG 34 production could not match demand. This led directly to the even more formidable, cheaper and easier to manufacture MG 42. The MG42 is considered by many experts to be one of the finest MGs ever made and matched by few rivals even today. The post-war US M60 LMG and British L7A1 GPMG unashamedly copied the best features of the MG 42. When the German Bundeswehr was reconstituted in the 1950s they considered the MG 42 better than anything then on offer! The result was the MG 42 was placed back into production by Rheinmetall (in 7.62 NATO calibre) as the MG 1, and later the MG 3.

Considering all the above it is not unreasonable to ask; was the German Army's advantage in GPMGs significant in the overall scheme of a modern war like the Eastern Front during WWII? Applying the methodology detailed in Part II (The Structure of the 1941 Soviet and Axis Resource Database) to the various MGs from WWII enables us to gain an insight into this question. Table Ger Res Database 1 reveals that the MG 34 in LMG mode had an OCPC (Overall Combat Power Coefficient) value of 8.56, while in the HMG mode the OCPC was 11.96. The corresponding tables from the Soviet FILARM model reveal the DP 1928 (squad LMG) had an OCPC value of 5.37, while the comparatively heavy and cumbersome Maxim 1910 MMG had an OCPC value of 8.63. **This means that on average German infantry squads had around 1.6 times more direct**

[2] The German *Stosstrupp* (shock troops) and *Stosstrupptakik* (shock troop tactics) were essentially the use of troops in small groups attacking the enemy with whatever weapons in a non-standard formation. The shock troops were trained in the use of infiltration tactics and close assault to destroy the enemy position. This represented a move away from the application of pure firepower and linear attack formations, to more flexible nonlinear formations. The German WWI shock troops were the genesis of the more modern flexible infantry squad. Refer S. Bull, Stormtrooper, Publishing News Ltd, London, 1999, for a good account of this history.

[3] Many western military historians maintain that the Bren Gun was probably the finest LMG of WWII and possibly ever. This is accomplished by the simple expedient of classifying the MG34 and MG42 as GPMGs (not LMGs) and comparing the MG 34's firepower and performance to much heavier MMGs and even very heavy HMGs. There are even extensive books on small arms which classify the MG 34 and MG42 as a Heavy Machine Gun in their Contents, e.g. The Illustrated Book of Guns, Edited D. Miller, Salamander Books Ltd, London, 2000.

firepower than the best equipped Soviet rifle squads. It also means that a German infantry squad had similar firepower to an enemy MMG, and was able to rapidly move this firepower forward to immediately support any attack or defence. This is before we even consider factors such as:

- Around half the rifle squads fielded by the Red Army in 1941 had no LMG at all (due to shortages of LMGs relative to the massive mobilisation programme).
- German infantry squads were also better equipped in other areas, particularly in terms of numbers and types of available hand and rifle grenades.
- German motorised infantry squads (*Schuetzen*) operating with panzer and motorised divisions had 2 MG 34 GPMGs per squad; giving these troops exceptional firepower.

When one considers that there were tens of thousands of infantry and rifle squads fighting each other every day during Operation Barbarossa, the German advantage in GPMGs in every squad becomes very significant in terms of affecting the overall course of the war. It also goes some way to explain the difference in casualty rates sustained by the respective sides at the tactical level.

There is little doubt that the MG 34 was the finest weapon of its generation. It remained unmatched by any equivalent Allied or Soviet weapon in WWII and was only superseded by the MG 42. The impact of the MG 34 GPMG on infantry combat in WWII, and the advantage it bestowed upon German infantry at the tactical level, is difficult to overstate. Interestingly, the superior firepower of the MG34 (and the later MG 42) is very carefully simulated in most tactical or tactical-operational level military simulations today. However for some mysterious reason this same superiority is ignored (or at least totally underestimated) in most current operational level simulations of WWII battles and campaigns. In many of these simulations, both side's infantry squads are treated as generic units with similar combat attributes. This is a mistake and will severely diminish the simulation's value.

If there are two things the reader should take away from this discussion on GPMGs, it is that all infantry and rifle squads are **not** equal, and that the impact of having tens of thousands of superiorly armed squads is very significant in any military campaign.

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Motorised Infantry Squads (*Schuetzen)*

In the period 1939-41, the German *schuetzen* or motorised infantry squads were the forerunners of the more famously titled *panzergrenadiers*. It wasn't until 1942 that the *schuetzen* regiments in the panzer divisions were renamed *panzergrenadier* regiments in recognition of their 'elite' status.[4] During Operation Barbarossa they were still most commonly referred to as motorised infantry.

The *schuetzen* or motorised infantry regiments formed the infantry support element of German panzer and motorised divisions, which in turn formed the spearhead of any panzer or motorised corps. As such, German motorised infantry squads were better trained and more heavily armed than normal infantry squads. If mounted in trucks, the motorised infantry squad had an additional MG34 LMG available for increased firepower. The trucks enabled the much heavier ammunition load required for two MG34s to be readily carried. If mounted in the Sd Kfz 251 armoured halftrack, the motorised infantry squad became a true 'armoured infantry squad'. In this mode the entire 10 man squad was carried in the Sd Kfz 251 and usually possessed two MG 34 MGs (including one with heavy tripod mount), eight Kar 98K rifles and two MP 38/30 SMGs.[5] One of the MG 34s could also be mounted on a special long range mount on the front of the Sd Kfz 251. In this configuration one of the squad's MGs effectively became a mobile supporting HMG with an armoured shield, which supported the squad when it dismounted from the Sd Kfz 251 and went into action. The Sd Kfz 251 represented the world's first true APC (armoured personnel carrier) and in 1940-41 the Sd Kfz 251-infantry combination represented the only modern armoured infantry force in the world. It wasn't until the US started mass producing the M3 armoured halftrack, and giving them to the UK and USSR in large numbers, that the rest of the world caught up.

In order to simulate the German motorised and armoured infantry squads in the Barbarossa simulation, the four main components required are separated in the Barbarossa simulation's resource database. Thus (in the TOE of panzer and motorised divisions) the complete motorised infantry squad will include a 'Heavy Rifle Squad', an additional 'LMG' and a 'truck'. Similarly, the complete armoured infantry squad will include a 'Heavy Rifle Squad', an additional 'LMG' and a 'Sd Kfz 251 APC'. In the latter case the Sd Kfz 251 is treated as an armoured fighting vehicle (AFV) with a MG34 as its main weapon.

[4] Dr M. Hughes, Dr C. Mann, Fighting Techniques of a Panzergrenadier: 1941-1945, MBI Publishing Company, Osceola, WI, USA, 2000, p. 21.
[5] B. Culver, J. Laurer, Sd Kfz 251 Half-Track 1939-1945, New Vanguard: Osprey Military, Oxford, 1999, p. 33.

Combat Engineer Squads (*Pionier*)

The second German squad type that needs special mention here is the *pionier* or combat engineer squad (listed as an 'Eng Sqd' in the tables above). To a large extent this unit was even more dangerous than the motorised infantry squad. The more commonly used term for this type of unit in other armies is 'sappers' or 'army-engineers'. However, in western armies and the Red Army in 1941, the terms sappers or army-engineers doesn't adequately encompass the full idea behind the German *pionier* squad. This is because German *pionier* units were relatively elite troops who were especially trained and equipped for close assault and close combat. They were trained and equipped for combat to a much higher degree than their British, US or Red Army counterparts. As such, *pionier* troops were extremely dangerous troops to face, especially where the defender was forced to defend fixed positions.

It is likely that the German *pionier* units in WWII owe their combat oriented pedigree to the development of s*tosstrupptakik* (shock troop tactics) by the German Army in WWI. The German s*tosstrupptakik* essentially involved the use of heavily armed troops attacking in small groups, and using infiltration tactics and close assault to destroy the enemy position. In the case of WWII *pionier* troops, 'heavily armed' includes MG34 GPMGs, MP38/40 SMGs, lots of grenades and grenade bundles, flame throwers, satchel charges, hollow charge explosives and various types of mines (refer below). In addition, the *pionier* battalions were designed to fulfil the more traditional battlefield engineer roles more commonly associated with sappers or army engineer units.

The first noticeable thing about the *pionier* squad is that it contained an MG34 GPMG and MG section. If the unit's prime role was battlefield construction etc this would have been a complete waste of resources. However in the German *pionier* squad it was needed to provide covering fire while the squad moved forward in combat. A similar analysis of weapons such as flame throwers and anti-tank (AT) rifles reveals that German *pionier*s normally had three flamethrower sections and three AT sections per *pionier* company (nine flamethrower and nine AT sections per battalion).[6] This means *pionier* squads had dedicated flamethrower teams (or sections) and AT rifles immediately on call if required. By way of comparison, the Red Army and all the German allied armies involved in Operation Barbarossa (the Finnish, Slovakian, Hungarian, Rumanian and Italian armies) had engineer squads without an integrated MG section. Similarly, contemporary western army's sapper squads needed heavy MG support from additional units if they were going to be used as close assault troops. In similar fashion, support from flame throwers was provided by separate flame thrower squads (eg in the Red Army's 5th April 1941 TOE Rifle Division).

In 1941 the AT rifle used by *pionier* troops was usually the *Panzerbuchse* 39 (covered in the next section). The flame throwers most commonly used were the *Flammenwerfer* 35 or *Flammenwerfer* 40. The *Flammenwerfer* 35 weighed 37 kg when filled and could project a flame 25 to 30 metres. Up to 35 bursts of flame (each of approximately 4-5 seconds) could be achieved with one filling. The lighter and easier to handle *Flammenwerfer* 40 (introduced in 1941) weighed 22 kg when filled. It could project a flame 20 to 25 metres and approximately 12 bursts of flame could be achieved with one filling.[7]

With their training in infiltration tactics and close assault, and a formidable array of available weapons, the German *pionier* squads had an Overall Combat Power Coefficient (OCPC) comparable to, or higher than, any infantry type squad in the world in 1941. In fact, when the Germans were struggling to deal with the T-34 and KV tanks in 1941, the use of *pionier* squads in close assault became one of the preferred methods to destroy them. For many German infantry divisions equipped with only light 37mm AT guns in 1941, *pionier* squads and precious medium to heavy artillery were the only really effective means of dealing with T34 and KV tanks. In order to simulate the additional flamethrowers, mines and assault charges available to *pionier* squads in the German FILARM model, the WCPC (Weapon Combat Power Coefficient) value of Eng Sqds is increased by 40%. This is shown by the higher WCPC value for Eng Sqds in table Ger Res Database 1. The high WCPC value also results in a high Overall Combat Power Coefficient (OCPC) value; despite the fact that *pionier* squads had a lower Tactical Responsiveness Factor (TRF) and a lower Concealment and Protection Factor (CPF) than comparable pure infantry squads.

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[6] A. Buchner, The German Infantry Handbook: 1939-1945, Schiffer Military History, Atglen, PA, 1991, p. 94.
[7] A. Buchner, The German Infantry Handbook: 1939-1945, Schiffer Military History, Atglen, PA, 1991, p. 98.