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Arthur Gullachsen

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Destroying the Panthers

The Effect of Allied Combat Action on I./SS Panzer Regiment 12 in Normandy, 1944

ARTHUR GULLACHSEN

Abstract: This article is an examination of the operational record of the World War Two German Panther tank during the Normandy Campaign of summer 1944. Challenging its perception as mechanically unreliable, this article argues Allied combat action was responsible for a large percentage of Panthers that were out of action. Secondly, the inferior resources of the German tank replacement and repair program were no match for superior Canadian Army practices during 1944. To support these arguments the author examines Canadian and German wartime primary documents as well as multiple secondary sources.

DURING THE SUMMER of 1944 in Normandy, the German *Panzerkampfwagen V* medium tank, the Panther, was one of the most dangerous armoured opponents of the Anglo-Canadian armies. Its design is often described in postwar writing as having the best mixture of speed, armour, and weaponry on the Second World War battlefield. Due to this successful formula, some writers have held up this late war German panzer as the forerunner of the modern main battle tank concept.¹ But this reputation has come under fire in current appreciations of the tank's operational record. The first production model, the Mark D, was plagued by mechanical defects due to its rushed development and premature deployment in

¹ Steven Zaloga, *Panther versus Sherman. Battle of the Bulge 1944* (Oxford: Osprey Publishing, 2008), 75. The main battle tank concept of one tank family for all missions is exemplified in the United States' M1 Abrams family of armoured fighting vehicles.

the July 1943 Battle of Kursk in the Soviet Union.² Eleven months later and on its third production model, large numbers of Panthers continued to be sidelined in operational units during the summer of 1944. Recent publications have utilised these figures as evidence of the Panther's ongoing reliability issues, even during the last year of the war.³ Evaluating Panther tank operational rates for Normandy, one would surmise that reliability problems were even more prevalent and German forces were struggling to make do with an unreliable vehicle. The conclusion presented is that the Panther was a largely non-functional weapons system due to its record of chronic mechanical breakdowns.⁴

This article will argue that Allied combat action, not mechanical reliability issues, was the main factor responsible for disabling a large percentage of Panthers. Mechanical defects in the first Panther model did significantly contribute to its disastrous combat debut in July 1943, but by spring 1944 the majority of mechanical faults had been resolved. While literature criticising the Panther's operational record focuses on mechanical defects, the incidence of battle damage is ignored as a cause. Furthermore, the inefficient German Army tank repair and replacement system, with its shortages and logistical issues, created a false impression that the Panther was mechanically defective. Its slow turn-around times and lack of replacement vehicles obscured the fact that Panthers were not unreliable, just being destroyed or disabled at a rapid rate. Due to its adequate frontal armour, many Panthers were only badly damaged and the Germans had a limited capability to replace or repair these tanks quickly. Quick repair was also hindered by the repair organisation being part of front-line German combat formations. In contrast, the Canadian Army's separate recovery, repair, and replacement process kept armoured regiments well supplied with serviceable tanks on a regular basis. Within German primary documents, the number of disabled tanks in a unit is divided between "short-term" and "long term" repair columns. While correct, these categories imply that the tanks in question had some part that was broken, defective, or worn out. Given the Panther's poor reliability record for 1943, it is easy to

² Robert Forczyk, *Panther versus T-34: Ukraine 1943* (Oxford: Osprey Publishing, 2007), 32–33.

³ Zaloga, *Panther versus Sherman*, 30.

⁴ *Ibid.*, 31.

assume from the returns that these issues were continuing. There is nothing in these reports that implies high-intensity combat operations against Allied forces were disabling a large number of tanks.

Recent works by John Buckley and Marc Milner adequately analyse the armoured battles in Normandy, but the topic of the recovery, repair, and replacement of armour receives little attention.⁵ This is an important factor to consider when analysing the operational record of armoured units. The number of tanks they managed to field directly influenced their ability to conduct their missions. This facet of the battle was almost as important as the operational events due to the rapid rate at which tanks were destroyed or disabled in Normandy.

In order to investigate Panther serviceability rates during the summer of 1944, I investigated the combat record of an average Panther battalion in Normandy. While partial data on the number of unserviceable Panthers for all nine battalions that served in Normandy is available, information on exactly why tanks were out of action is difficult to obtain. Surviving war diaries of the German panzer regiments involved in the fighting are few. However, one war diary—that of Schutzstaffel (ss) Panzer Regiment 12 of the Waffen ss (the military wing of the Nazi Party) 12th ss Panzer Division “Hitlerjugend”—did surface in the former Czechoslovakia. The Panther battalion of this regiment commenced combat operations on 8 June 1944 and went on to oppose every major Allied operation on the eastern flank of the Normandy bridgehead until early July 1944.⁶ Its war diary contains details on each Panther that was lost, badly damaged, or broken down.

To support this article’s main argument, a statistical analysis was completed on the number of tanks lost or suffering battle damage within this unit over the course of a month.⁷ This statistical analysis builds on information already available in order to highlight the

⁵ John Buckley, *British Armour in Normandy* (London: Frank Cass, 2004), Marc Milner, *Stopping the Panzers* (Lawrence: University Press of Kansas, 2014).

⁶ Vojensky Historicky Archiv Praha (Military history Archives) (VHAP), Prague, Czech Republic, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944.* Trans. in Norbert Szamveber, *Waffen SS Armour in Normandy: The Combat History of SS-Panzer Regiment 12 and SS-Panzerjäger Abteilung 12, Normandy 1944. Based on their original War Diaries.* (Solihull: Helion and Company, 2012), 35–96.

⁷ Szamveber, *Waffen SS Armour in Normandy*, 35–96. This was completed by using the war diary of I./SS-Panzer Regiment 12, present in the Prague Military Archives and reprinted and translated in Szamveber’s *Waffen SS Armour in Normandy*.

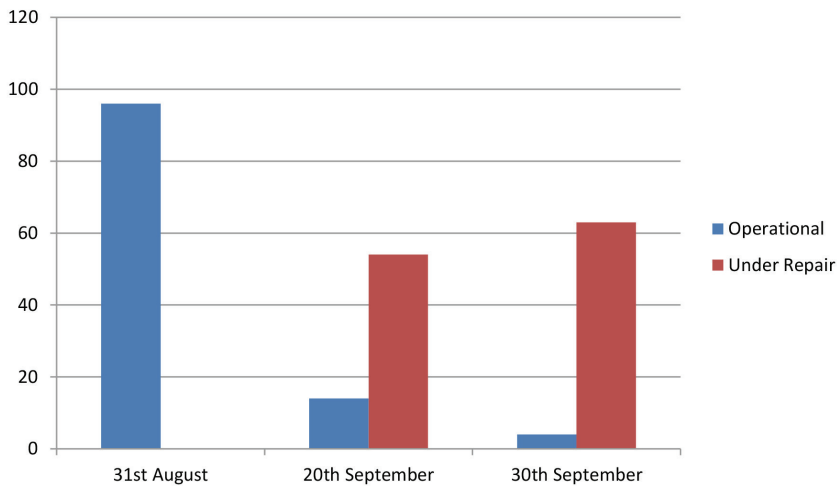
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Chart 1: Number of operational Panthers versus those in repair for the 2nd battalion, 23rd Panzer Regiment in the Ukraine, August–September 1943. [Thomas Jentz, *Panzertruppen Volume 2*]

effect of battle damage.⁸ The “Hitlerjugend” Panther battalion began combat operations with sixty-six Panthers on strength, and received a further thirteen in early July, bringing it in line with its authorised establishment of seventy-nine. On paper the battalion consisted of four companies, each with seventeen Panthers, as shown in Figure 1. A further eight were to be assigned to the battalion headquarters, and three were allocated as regimental headquarters command tanks.⁹

Before examining the combat record of this Panther battalion, it is necessary to chronicle the transition of the Panther from defective prototype to a vehicle with average automotive reliability. An example of late-war German technology intended to have impressive strengths in armour and weaponry, considerable effort was made to make it technologically superior to its foes. These strengths were achieved at the cost of automotive reliability in the first production model. On the orders of Adolf Hitler, its frontal armour was increased to 80mm, raising the tank’s weight to 45 tons.¹⁰ The drive train was

⁸ This table is the original work of the author of this article.

⁹ Thomas Jentz, ed., *Panzertruppen Volume 2: The Complete Guide to the Creation & Combat Employment of Germany’s Tank force: 1943–1945* (Atglen: Schiffer Military History, 1996), 165–167.

¹⁰ Forczyk, *Panther versus T-34*, 12–13.

initially designed for a much lighter vehicle, and this increased weight led to the engine, transmission, and final drives being overstressed. Inadequate initial fuel pump and engine compartment design led to engine fires during the summer of 1943 which engulfed the tank. The first Maybach engine was also a weak link, with bearings and connecting rods that failed after a short period of time. A large number of tanks in the Panther battalions are recorded as sidelined due to these maintenance issues during the fall of 1943.¹¹ As illustrated in Chart 1, these figures are abysmal.¹²

Reviewing these factors, one could infer that the tank could not be maintained, taken on long road marches, driven hard, or be operated by a normal crew past a minimum number of kilometres.¹³

But was this still the case by the summer of 1944, roughly a year after its 1943 combat debut at Kursk? By this date sufficient time and resources had been devoted to improving the Panther, and front line units were beginning to receive the last model seen in the war, the Mark G. By spring 1944, the worst of the teething troubles that had plagued the first model were rectified. While never matching the Russian T-34 tank for speed and off-road capability, the Panther was not sluggish. Citing a US Army report on captured armour, Canadian military historian Roman Jarymowycz highlights its positive attributes. A salient point within this report is the Panther's superior cross country driving ability. Its wide tracks were excellent for weight distribution, preventing it from sinking in mud or soft ground.¹⁴ The interleaved road wheels, much maligned as a maintenance problem, also aided in weight distribution and provided a cushioned ride. Compared to the US M4 Sherman, the Panther was a much better performer climbing steep inclines and negotiating muddy conditions. It could manage thirty kilometres per hour cross country,

¹¹ Zaloga, *Panther versus Sherman*, 31. The percentage of Panthers in workshops was thirty to forty percent of total holdings. Zaloga asserts this was due to mechanical unreliability and does not mention enemy action.

¹² Jentz, *Panzertruppen Volume 2*, 116.

¹³ Zaloga, *Panther versus Sherman*, 30. Zaloga states the Panther is an automotive failure due to weak final drives and an overstressed transmission that led to premature stripping of the third gear. The Panther had single-tooth spur gears rather than sophisticated double-herringbone gears, present on Allied tanks.

¹⁴ Roman J. Jarymowycz, "The Quest for Operational Manoeuvre in the Normandy Campaign. Simonds and Montgomery Attempt the Armoured Breakout", Unpublished PhD Dissertation, McGill University, 1997, 288.



A Panther travelling at high speed through Paris en route to Normandy, summer 1944. [Bundesarchiv Bild 101I-494-3390-19. Foto: Zwimm. 1944 Sommer.]

which was five kilometres per hour faster than a Sherman.¹⁵ The US Army extensively test-drove captured Panthers in Normandy, films of which exist online. The tanks in question appear to be driven quite hard and fast.¹⁶ US forces in late 1944 and early 1945 reported that in tank versus tank engagements with weak German armoured forces, the Panther had shown remarkable manoeuvrability in contrast to the US Sherman.¹⁷

Automotively, the Mark A and G Panther models were huge improvements over the disastrous Mark D models (D coming before A) that debuted at Kursk in 1943. Key automotive improvements on the Mark A included reinforced road wheels with twenty-four bolts instead of the original sixteen that were overstressed by rough terrain. In early 1944 a modified Maybach HL 230 P30 motor was governed to 2,500 RPM to prevent overheating and the potential of engine fires.

¹⁵ Jarymowycz, "The Quest for Operational Manoeuvre", 281, 286. Major General White. White Report. Exhibit No 2. Colonel I.S. Hinds, Commander CCB, 2 Armd; Comparison of US Equipment with similar German equipment. 20 March 1945.

¹⁶ "Tanks Bivouac Area. U.S. Soldiers trees in the background." *Critical Past*, available: http://www.criticalpast.com/video/65675041538_tanks_bivouac-area_United-States-soldiers_trees-in-the-background, [accessed 2 March. 2015]. This tank is from the Panzer Lehr Panzer Division and was later shipped to Aberdeen Proving Grounds.

¹⁷ Thomas Jentz, ed., *Germany's Panther Tank: The Quest for Combat Supremacy* (Atglen: Schiffer Military History, 1997), 156.

Redesigned fuel pumps on the engine were reliable and did not leak. With the new engine also came an additional crank shaft bearing set: copper head gasket seals to combat blown head gaskets and dual air cleaners. Each air cleaner had a different purpose, one cooling the lubricating oil and the other cooling the engine radiators. Last on the Mark A came two external cooling pipes on the left hand exhaust pipe that cooled the left exhaust header.¹⁸ The Mark G continued the theme of automotive improvements with strengthened radiator fan blades to improve the ability of the tank's cooling system to remain functional during combat. Most importantly, all aspects of the final drives were strengthened on production models from September 1944 onward. These improvements consisted of strengthening the transmission's straight cut gears, increasing lubrication and improving final drive housing durability to avoid bolts being sheared off.¹⁹ US author Thomas Jentz, in his work *Germany's Panther Tank*, relates the following comments of the German inspector of armoured forces, General Heinz Guderian, regarding the 1944 Mark A model: "The latest experience reports from the *Panzer-Abteilungen* (Panther battalions) state that with the exception of minor deficiencies, the Panther is at last front ripe."²⁰

Though improved in 1944, the Panther still had automotive shortcomings in comparison to Allied tanks. A spring 1944 report from the 1st battalion of Panzer Regiment 2 states that the Mark A's engine life was limited to 1,700 to 1,800 kilometres and the transmission life only lasted 1,500 to 1,800 kilometres. The report also states that there were still significant problems with the durability and engagement ability of the third gear. If a new replacement transmission was not available, drivers could short shift from second to fourth gear and get another 250 kilometres out of the tank, but this would ultimately damage the clutch. The final drives and their housings were reported to be weak and the Panther could not steer in reverse in heavy soil or mud.²¹ The stress the transmission placed against the final drive assembly while turning in reverse would eventually shear off bolt-heads on the assembly.²²

¹⁸ Ibid., 61–62, 78.

¹⁹ Ibid., 89–96.

²⁰ Ibid., 139.

²¹ Ibid., 139–142.

²² Ibid., 138.

These were significant failings, but given the large amount of complete tank write-offs that Germany endured from mid-1944 onwards, the average life span of a tank included very limited engine mileage.²³ If its life-cycle did last months, it was likely to be placed in the workshops due to significant battle damage. A battle damage repair job on a Panther could also be used to overhaul the transmission, engine and final drives. Taking these factors into account, it did not mean much to a Panther battalion that their tanks had a limited automotive lifespan before a major overhaul was needed. A tank would likely be destroyed or would need major battle damage repairs prior to this.

The operational record of the case study unit for this article, the 12th ss Panzer Regiment's Panther battalion, begins with its deployment to Normandy. In recent works the mobility of the Panther has been highlighted as a significant weakness. Instances are recounted that suggest rail transport was used to get panzer units close to the front to save on the wear and tear of fragile panzers.²⁴ In reality, the tank's improved reliability in the summer of 1944 allowed its crews to conduct long road moves. This was made evident by Panther battalions in Normandy conducting regular forced marches during June-July 1944.²⁵

The Allied invasion of 6 June 1944 found the individual companies of the "Hitlerjugend" Panther battalion billeted to villages around Le Neuborg, France and the battalion staff company in the town itself.²⁶ On being ordered to the invasion front, the fastest way the leadership of the 12th ss Panzer Regiment could get its Panthers there was by driving them. The sixty-six tanks of this unit covered a distance of 140 kilometres to reach the Normandy combat zone, travelling from 6 to 8 June 1944 under incessant air attack. For a tank unit in the

²³ Jentz, *Panzertruppen Volume 2*, 284. Panther losses as total write-offs for July, August, and September were 373, 290, and 692, respectively. Total new Panthers produced for the same months totalled 380, 350, and 335.

²⁴ Zaloga, *Panther versus Sherman*, 31. Zaloga argues that Panther units were transported by rail as far forward as possible to avoid breakdowns. This is true, but it was mainly to save fuel, which Germany was critically short of. The Panther was capable of long road marches on good roads.

²⁵ Two of most significant route marches involving Panther units were by I./Panzer Regiment 6 of the Panzer Lehr Division, and I./SS-Panzer Regiment 12 of the 12th SS Panzer Division "Hitlerjugend".

²⁶ VHAP, *Kriegstagebuch Nr. 1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 6 Juni 1944*. Szamveber, *Waffen SS Armour in Normandy*, 35-40.

Second World War, this was a sizeable distance. A number of tanks would be expected to fall out, despite maintenance halts.²⁷

The march of the battalion began at 1 p.m. on 6 June 1944 and evening found the companies in the following locations: The 1st Company had reached Berthouville, the 2nd was in Barsen, the 3rd was in Le Thiel-Nolent, and 4th Company had reached in St. Claire. The battalion staff company had reached Boissy. Late evening saw the battalion continue west via the route Thiberville-Orbec-Monnai-Gace. From there the march continued all day on 7 June 1944 via Trun-Falaise-Thury Harcourthen to Amaye in the Maizet district.²⁸ Here the battalion was dispersed and waited for fuel on the night of 7–8 June 1944. It is noted at this point that a single Panther that had become separated from its company rejoined it.²⁹ Frequent maintenance halts and Allied air activity had resulted in major traffic jams, causing delays.³⁰ Panther crews also drove at less than maximum speed during road moves to preserve engines and transmissions. Night driving would have been conducted in blackout conditions, also reducing speed to a minimum.

Total personnel losses from enemy air attacks during the route march was one soldier killed on 7 June 1944. Total vehicle losses to Allied combat action consisted of four trucks and a Flakpanzer 38t of the anti-aircraft platoon. One supply truck was lost due to an accident and six other trucks were temporarily out of action.³¹ To this point the battalion had covered a total of 120 kilometres from its former garrison of Le Neuborg. It is important to note that within the 12th ss Panzer Regiment war diary there is no entry to the effect of a large amount of vehicles falling out due to mechanical issues. The largest challenges during the march had been supplying the

²⁷ Captain H.A. Sargeant, *No.2 Operational Research Section, Main H.Q., 21st Army Group - Report No. 18 on Tank Casualties during the Exploitation Phase after the crossing of the Seine*. File E2004.693 (Bovington, England: Tank Museum Archives November 1944), 3-4. During the period 28 August–7 September 1944, the 4th Canadian Armoured Division lost fifty-seven tanks to mechanical causes and only five to enemy action.

²⁸ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 7 Juni 1944*. Szamveber, *Waffen SS Armour in Normandy*, 35–40.

²⁹ Stephane Cazenave, *Panzerdivision Hitlerjugend Volume 2: Panzer Regiment 12 Normandie 1944* (Paris: Maranes Editions, 2014), 179.

³⁰ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 6–7 Juni 1944*. Szamveber, *Waffen SS Armour in Normandy*, 35–40.

³¹ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 6–8 Juni 1944*. Szamveber, *Waffen SS Armour in Normandy*, 35–41.

fuel requirements of the Panthers and avoiding losses due to fighter bomber attacks which caused chaos on the roads leading to Caen.

At midnight on the night of 7–8 June 1944 the battalion was directed to support the future operations of 26th ss Panzer Grenadier Regiment. Fuel did not arrive until morning, and by 9:30 a.m. company columns of Panthers set out to drive the last twenty kilometres to their assigned jump-off positions. From this date onward the Panther battalion was engaged in constant offensive and defensive operations until 11 July 1944, when it was placed in reserve.

Table 1 is the result of statistical research undertaken using a number of primary and secondary sources in order to measure the battalion's vehicle attrition over the course of one month in combat. This detailed table builds on data that has already been tabulated and corrects errors within some works. The first column is the reporting date for when data was recorded. The second column states the total number of Panthers held by the battalion, both serviceable and under repair, at the end of the day. The third contains the number of Panthers that were serviceable on that date. These figures are only presented on dates when no combat occurred. There are other reported figures, but these are largely inaccurate due to the combat losses that took place on these dates. The fourth column states the number of Panthers that were completely destroyed on a certain date and the fifth column is the number that were recorded as suffering battle damage. The sixth column is the total number of Panthers under repair, calculated by subtracting the serviceable number from the total holdings. These figures again are only taken on non-combat days. The seventh column is the percentage of Panthers under repair, out of the entire holdings. The eighth column is any recorded deliveries of new tanks.

The first combat operation of the 12th ss Panzer Division's Panther battalion was the 8 June 1944 night attack on the village of Bretteville-L'Orgueilleuse, held by the Regina Rifle Regiment of the 7th Canadian Infantry Brigade. On the afternoon of the 8 June 1944 the 1st and the 4th Companies had arrived in their assembly areas near the village of Franqueville. Secondary sources mention at least three tank platoons from each company were in action during the night fighting. Accounts also mention the use of the regimental command Panther and a company commander's tank from the 1st Company. These figures support an estimate of twenty-six Panthers, a number very similar to the twenty-two mentioned in Canadian

Date	Total holdings of Panthers	Serviceable Panthers ³³	Total write-offs ³⁴	Battle damaged	Total number under repair	Percent Under repair	New Panthers Delivered
1 June, 1944	56	48	Nil	Nil	8	14	Nil
4 June, 1944	66	No data	Nil	Nil	No data	No data	10
7 June, 1944	66	No data	Nil	Nil	No data	No data	Nil
8 June, 1944	63	No data	3 ³⁵	2 ³⁶	No data (2 battle damage)	No data	Nil
9 June, 1944	56	No data	7 ³⁷	3 ³⁸	No data (3 battle damage)	No data	Nil
11 June, 1944	54	No data	2 ³⁹	3 ⁴⁰	No data (3 battle damage)	No data	Nil
16 June, 1944	54	38	Nil	Nil	16	30	Nil
17 June, 1944	54	38	Nil	Nil	16	30	Nil
18 June, 1944	54	33	Nil	Nil	21	39	Nil
20 June, 1944	55	42	Nil	Nil	13	24	1 ⁴¹
22 June, 1944	55	42	Nil	Nil	13	24	Nil
23 June, 1944	55	43	Nil	Nil	12	22	Nil
24 June, 1944	55	44	Nil	Nil	11	20	Nil
25 June, 1944	53	No data	2 ⁴²	3 ⁴³	No data (3 for battle damage)	No data	Nil
26 June, 1944	48	No data	5 ⁴⁴	Nil	No Data	No data	Nil
27 June, 1944	45	No data	3	3 ⁴⁵	(3 for battle damage, 1 engine failure)	No data	Nil
28 June, 1944	44	No data	1	1 ⁴⁶	No data (1 battle damage)	No data	Nil
29 June, 1944	44	No data	Nil	1 ⁴⁷	No data (1 for battle damage)	No data	Nil
2 July, 1944	44	24	Nil	Nil	20	45	Nil
4 July, 1944	44	No data	Nil	3 ⁴⁸	No Data (3 battle damage)	No data	Nil
5 July 1944	42	No data	2 ⁴⁹	Nil	No Data	No data	Nil
6 July, 1944	55	28	Nil	Nil	16	29	13
7 July, 1944	55	39	Nil	Nil	18	33	Nil
8 July, 1944	46	No data	9	3 ⁵⁰	No data (3 battle damage)	No data	Nil
9 July, 1944	46	18 ⁵¹	Nil	Nil	29	63	Nil
10 July, 1944	46	18	Nil	Nil	29	63	Nil
11 July, 1944	43	No data	3 ⁵²	Nil	No data	No data	Nil
Totals / Averages	80	35	37	22	17 per day	34	23

Table 1: Losses and battle damage within SS Panzer Regiment 12's Panther battalion, 8 June–11 July 1944. [SOURCE]

sources.³² For a vehicle that current literature perceives to be mechanically unreliable, it appears large percentages of the 4th and 1st Companies survived the road march. In this first combat action both companies took losses in return for no significant gains in and around the fortified village. Three Panthers were written off and two were badly damaged by anti-tank fire and infantry anti-tank weapons.

³² Marc Milner, *Stopping the Panthers*, 262–263. Canadian sources who witnessed the Panther assault counted roughly twenty tanks near Bretteville and twenty-two tanks near Cardonville Farm. As the 1st and 4th Companies were involved and the total strength of the regiment stood at sixty-six on the 8–9 June, only one of the companies would have been at their authorised level of seventeen tanks.

³³ Niklas Zetterling, *Normandy 1944: German Military Organization, Combat Power and Organizational Effectiveness* (Winnipeg, MB: J.J. Fedorowicz Publishing, 2000), 360–361. Operational returns for SS Panzer Regiment 12, sourced from Bundesarchiv-Militärarchiv (BA-MA) primary documents dated June–July 1944. Freiburg, Germany.

³⁴ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 8 Juni–11 Juli 1944 über zerstörte Panther*. Szamveber, *Waffen SS Armour in Normandy*, 47–57.

³⁵ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, Tagebucheinträge 8 Juni 1944*. Anhang 3. Panthers 425, 418, and 427 were written off by A/T gun fire. Szamveber, *Waffen SS Armour in Normandy*, 41–44.

³⁶ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 8 Juni 1944*. Panthers 116 and 425 were damaged by A/T gun fire. Szamveber, *Waffen SS Armour in Normandy*, 41–44.

³⁷ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 9 Juni 1944*. Panthers 325, 328, 335, 336, 337, and 338 destroyed as near Norrey. Panzer 471 was later destroyed by A/T gun fire. Szamveber, *Waffen SS Armour in Normandy*, 45–47.

³⁸ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 9 Juni 1944*. Panthers 404, 327, and 329 were damaged by A/T gun fire. Szamveber, *Waffen SS Armour in Normandy*, 45–47.

³⁹ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 11 Juni 1944*. Anhang 5. Panther 435 was destroyed in Rots. Panther 438 was severely damaged by tank fire and later retrieved at night some days later. It is counted as a complete loss because it was abandoned in enemy territory. Szamveber, *Waffen SS Armour in Normandy*, 51–55.

⁴⁰ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 11 Juni 1944*. Panthers 425 and 405 were damaged by anti-tank fire and 426 was repaired during battle. Szamveber, *Waffen SS Armour in Normandy*, 51–55.

⁴¹ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 20 Juni 1944*. Panther 438 retrieved from Rots in a night recovery with a prime mover. Szamveber, *Waffen SS Armour in Normandy*, 65.

A sizeable number of tanks also saw action on 9 June 1944. During the attack on Norrey-en-Bessin, the 3rd Company deployed a total of twelve Panthers in three platoons. This is very close to the number of operational 3rd Company Panthers that left Le Neuborg on 6 June 1944.⁵³ A full company on paper would have been seventeen Panthers, with five in each platoon and two for the company commander and the company troop leader. On 1 June 1944 the war diary reported that the 1st and 2nd Companies had seventeen Panthers each and the

⁴² VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 25 Juni 1944*. Panthers 217 and 438 were total losses. Szamveber, *Waffen SS Armour in Normandy*, 69–72.

⁴³ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 25 Juni 1944*. Panthers 429, 415 and 425 were damaged by A/T and tank fire. Szamveber, *Waffen SS Armour in Normandy*, 69–72.

⁴⁴ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 26 Juni 1944*. Panthers 236, 427, 204, 419 and an unknown Panther were total losses. Szamveber, *Waffen SS Armour in Normandy*, 72.

⁴⁵ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 27 Juni 1944*. Anhang 7. Panther 405 suffered an engine failure during combat. It was not lost. No turret numbers on those three Panthers that were damaged by A/T and artillery fire. Szamveber, *Waffen SS Armour in Normandy*, 74–76.

⁴⁶ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 28 Juni 1944*. One tank is mentioned going to the repair facility. No turret number. Szamveber, *Waffen SS Armour in Normandy*, 77–80.

⁴⁷ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 29 Juni 1944*. No turret number data. One Panther was damaged by tank fire. Szamveber, *Waffen SS Armour in Normandy*, 81.

⁴⁸ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 4 Juli 1944*. Panthers 117, 228, and 237 were damaged by artillery fire. Szamveber, *Waffen SS Armour in Normandy*, 81.

⁴⁹ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 5 Juli 1944*. Panthers 418 and 138 were total losses. Szamveber, *Waffen SS Armour in Normandy*, 84–86.

⁵⁰ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 8 Juli 1944*. No turret number data. Szamveber, *Waffen SS Armour in Normandy*, 87–88.

⁵¹ 9–11 July 1944 was a period of calm after intense combat that saw the British and Canadians drive the Germans out of the approaches to Caen. It is understandable that this period would be seized to carry out repair and maintenance on Panthers as the Panzer Regiment re-grouped south of Caen, hence the high maintenance rate.

⁵² VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944, Tagebucheinträge 11 Juli 1944*. No turret number data. Szamveber, *Waffen SS Armour in Normandy*, 94–95.

⁵³ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944*. Szamveber, *Waffen SS Armour in Normandy*, 43. Hubert Meyer, *The History of the 12. SS Panzer Division Hitlerjugend* (Winnipeg: J.J. Fedorowicz Publishing, 1994), 58.

3rd Company only had ten.⁵⁴ Ten more Panthers had been delivered by 6 June, strengthening the 3rd Company and finally getting the 4th Company some tanks. Up to late May 1944 this last company had only trained on other company's tanks.

It is accurate to assess the tanks involved in the operations on 8–9 June 1944 as being mechanically reliable in combat, despite coming off a recent 140 kilometre road march in difficult circumstances. In reviewing accounts of this action, there is no mention of a Panther breaking down or being abandoned in combat due to a mechanical fault. While the Panthers did not fail mechanically, the 9 June attack on Norrey was a spectacular reverse. Tanks of the 6th Canadian Armoured Regiment and supporting anti-tank guns south of Bretteville hit the advancing 3rd Company in the flank with accurate defensive fire. As reflected in Table 1, a total of seven Panthers were lost near Norrey over the course of the day as complete write-offs, and a further three were badly damaged.

A third battle for the Panther battalion took place on 11 June in the village of Rots. Here the Germans were again overwhelmed, and eventually the 4th Company and supporting infantry had to withdraw due to Anglo-Canadian pressure. A total of two 4th Company Panthers were written-off and a further three were badly damaged by tank and anti-tank gun fire during the defence of the village. In action the Panthers again displayed adequate reliability, with none falling out due to mechanical failure. There is even an account of the 4th Company commander driving at high speed in reverse through the village during one point in the fighting.

During these three actions Anglo-Canadian infantry anti-tank weapons, anti-tank guns, tanks, and artillery put the maximum amount of fire possible on attacking Panthers.⁵⁵ The ferocity of the anti-tank fire alone had led to large losses, most notably on 9 June 1944 at Norrey-en-Bessin, where six Panthers were written off and

⁵⁴ Meyer, *The History of the 12. SS Panzer Division Hitlerjugend*, D-4.

⁵⁵ Buckley, *British Armour in Normandy* (London: Frank Cass, 2004), 93. Allied defense of newly-won positions was particularly effective and used all arms.



3rd Company SS Panzer Regiment 12 Mark A Panther destroyed near Norrey-en-Bessin, France on 9 June 1944 and later used as target practice. [Library and Archives Canada PA-130338]

two severely damaged in ten minutes.⁵⁶ Due to these heavy losses, on 14 June 1944 the 3rd Company handed over all its remaining tanks in order to be re-equipped back in its former garrison of Le Neuborg, 140 kilometres to the south east.

On 25 June 1944, the remaining three Panther companies launched counter-attacks against diversionary attacks by the 49th British Infantry Division on the village of Fontenay Le Pesnel. These were conducted to draw German forces away from the upcoming 8th British Corps Operation “Epsom”. During this inconclusive fighting two Panthers were lost and three were damaged. A further nine were lost and five badly damaged in the next four days fighting against the main British attack of three divisions and two independent brigades. During the defensive effort from 25 June to 30 June 1944, the Panther battalion employed all operational tanks to attempt to halt the advance. Encircled at one stage, the battalion was forced to break out after an unsuccessful relief attempt by the 1st SS Panzer

⁵⁶ Oliver Haller, “The Defeat of the 12th SS: 7–10 June 1944,” *Canadian Military History* 3, no. 1, (1994). Meyer, *The History of the 12. SS Panzer Division Hitlerjugend*. While recounting the firefight accurately and noting the effectiveness of the Firefly armament, Oliver Haller and Hubert Meyer quote the losses as seven, when only six of the 3. Kompanie Panthers were complete write-offs and two were badly damaged. Panther 471 from 4. Kompanie was destroyed later in the day, for a total of seven.

Corps Tiger tank battalion.⁵⁷ Again a lack of German coordinated tank-infantry tactics meant that Panthers fought alone or in small groups.

Further fighting during early July 1944's Canadian Operation "Windsor" caused more losses. The attack of the 8th Canadian Infantry Brigade to capture Carpiquet village and its airfield saw small groups of Panthers from the 1st, 2nd, and 4th Companies engage in long range fire fights. Though the defence of the airfield was partially successful, the fighting of 4 and 5 July 1944 cost two Panthers as complete write-offs and another two were disabled due to battle damage.

During Operation "Charnwood," the Anglo-Canadian attack on Caen, the 3rd Company, re-equipped with thirteen new tanks, was engaged in combat operations. Attacking to support the 25th ss Panzer Grenadier Regiment defending Buron, this advance ran into heavy defensive fire from British tank destroyers of the 62nd Anti-Tank Regiment, Royal Artillery (RA). Firing their seventeen-pounder armament from the edge of an orchard, they managed to destroy several advancing Panthers. Who got the first shot off in an engagement was very significant in 1944, and this factor influenced the one-sidedness of this engagement.⁵⁸ In the fighting that raged throughout the day, the company took further losses from indirect and direct fire. As reflected in Table 1, this resulted in a total of nine Panthers being complete write-offs and three being battle-damaged.⁵⁹

Following the order to disengage and redeploy all divisional heavy weapons south of the Orne River in Caen, between 9 and 11 July 1944 the entire battalion withdrew to the south. All disabled tanks were removed from various workshop platoon locations. Once across the river, a further failed minor counterattack near Maltot miscarried and another three Panthers were written off. After this action the division and its panzer regiment were placed in reserve. Its new assembly area was St. Aignan de Cramesnil, which it had occupied by 12 July 1944.⁶⁰ Temporarily out of the line, the panther

⁵⁷ Szamveber, *Waffen SS Armour in Normandy*, 69–72.

⁵⁸ Buckley, *British Armour in Normandy*, 90. First shot, first hit was decisive factor in Normandy tank firefights.

⁵⁹ See Table 1, 8 July 1944. Most of the losses occurred within 3. Kompanie.

⁶⁰ Hubert Meyer, *The History of the 12. SS Panzer Division Hitlerjugend*, 154. The 12. SS Panzer Regiment command post was three kilometres west of St Sylvain, 16.5 kilometres southeast of the Caen Orne bridges.



SS-Kriegsbericht Woschidlo. 3rd Company SS Panzer Regiment 12 Panthers involved in a road march during June 1944. [Bundesarchiv Bild 146-1976-100-27. Foto: O. Ang/1944]

battalion urgently conducted repairs and maintenance which had been neglected for some time.⁶¹

The instances of high losses for the Panther battalion during the majority of its combat operations are directly attributable to Anglo-Canadian forces that were well trained, equipped, and using combined arms teams to defend and attack. Due to poor German combined arms tactics, armoured forces would often act individually without artillery or infantry support. Without this support, assets that could have made things considerably easier for the Panther platoons were missing. During the attacks on the villages of Bretteville L'Orgueilleuse and Norrey en Bessin during 8–9 June 1944, lack of coordination significantly affected their efforts.⁶² The fault for these reverses lies with the tactical leadership of battle group commander ss Colonel Kurt Meyer for not arranging proper artillery and infantry support. This failure was compounded by the ineptitude of the 12th ss Panzer Regiment commander, ss Major Max Wunsche, for failing

⁶¹ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944*. Szamveber, *Waffen SS Armour in Normandy*, 96.

⁶² Milner, *Stopping the Panthers*, 294–296.

to force the issue with Meyer.⁶³ When the Germans tried to remedy the lack of infantry, Allied artillery hammered its movements.⁶⁴

A difficult challenge for Panther crews in combat was the issue of numerical inferiority, a factor which influenced the number of panzers that were destroyed or put out of action. Instances of battle damage were far more probable due to Panthers in company or platoon strength attacking superior numbers of Allied tanks or groups of anti-tank guns. Numerically superior forces firing at a high rate would often target individual Panthers with multiple tanks or anti-tank guns. In the course of engagement that could last hours, the probability of all Panthers being hit at least once was very high.

The large number of tanks that escaped total destruction and were only damaged highlights the capability of the Panther's armour. The sloped armoured hull that limited its automotive ability was vital to its survival capability. British author John Buckley notes that the all-around armour of the German Panther was excellent: "In one action, at a range of just 800 yards (731 metres), a tank of the Royal Scots Greys hit a Panther four times with its 75mm gun only to see the shells bounce off harmlessly".⁶⁵ This action, which took place during the fighting on Hill 112 during Operation "Epsom," could have very well involved a tank of the 12th ss Panzer Regiment's Panther battalion. The 80mm sloped hardened steel front glacis plate of the Panther and its thickened turret mantlet could absorb or deflect the penetrative abilities of most Allied weaponry. US combat reports on tank versus tank engagements speak of multiple hits on the Panther's mantlet and frontal armour without appreciative damage during extended firefights.⁶⁶ Provided vital areas such as the fuel tanks, engine, crew compartment, drive sprockets, or tracks were not severely damaged, the Panther could continue to manoeuvre or withdraw as needed. For a Canadian Sherman, there was often no chance to retire due to battle damage. One direct hit from a Panther's armament, anywhere on its hull at combat ranges, could penetrate the armour with ease causing a catastrophic fuel or ammunition fire.

⁶³ Milner, *Stopping the Panzers*, 294–296.

⁶⁴ Haller, "The Defeat of the 12th SS: 7–10 June 1944," 13–14.

⁶⁵ Buckley, *British Armour in Normandy*, 32. This event is originally mentioned Major J.J. How's book *Hill 112*.

⁶⁶ Jentz, *Germany's Panther Tank*, 155–156.

Still, non-fatal damage to the Panther by direct fire weapons could force it from the battlefield. If the armour was penetrated and a crew member was wounded or killed, it would retire. If it had a penetration to its flank which damaged the radios or transmission, it could not communicate or drive properly. If it had a turret penetration that damaged the interior of the turret or its ability to traverse, it would exit the combat zone. If it had significant damage to its tracks or drive train, the crew would often bail out. They could then arrange to have it towed away by another Panther or Bergepanther recovery tank to road where a Famo heavy half-track could tow the tank to a repair facility.⁶⁷

Any damage to the main gun would force the Panther to retreat. The 75mm KWK L/70 gun was far from fragile, but at the same time a precision instrument meant to engage targets to a maximum of 1,500 metres. Hits to the barrel or muzzle brake immediately disabled the gun, and often the sights would be put out of alignment by the shock or partial penetration accompanying a direct hit on the mantlet. Panther drivers and crew commanders were trained to steer the tank into incoming enemy fire, as to let the armour of the Panther do its job, protecting the vulnerable flanks of the tank at the same time. While this tactic allowed the tank to survive, it increased chances of hits on the main armament.

Indirect fire and mines were also a problem for German tank crews. On detection Panthers were shelled intensively with all kinds of indirect fire and often ran into belts of Allied anti-tank minefields. Mines and artillery could damage the track and road wheels significantly, and this damage could take up to a day to repair. If a mine field was covered by direct and indirect fire, an immobile Panther would become a sitting target. Indirect artillery strikes on the turret top or engine cover could cause severe engine or main gun damage.

To cope with the constant repair demands that stemmed from combat, an effective repair and recovery system was needed for the German armoured forces. The main failing of the German process

⁶⁷ Waldemar Trojca, *Pzkwfw. V Panther Volume 2* (Gdansk: AJ Press, 1999), 3, 22–23. The Bergepanther was capable of towing Tiger I and II tanks, as well as the Ferdinand tank destroyer. It also had a winch that was capable of moving 40,000 kilograms a total of 150 metres at ten metres per minute. It was an extremely capable armoured recovery vehicle.

was that it was located within the panzer regiment, rather than the responsibility of a separate dedicated organisation in a stable environment. All the supply and movement chaos of the front negatively affected the repair process. Panther repair turn-around times could be extended if workshop units were swamped by a large number of damaged tanks. Vehicles were prioritised for repair by a triage process that saw more difficult cases transported to the rear and others ignored. Maximum resources were allocated to tanks that could be quickly repaired. The process was also conducted entirely outdoors, or if the repair unit was lucky, a barn or outbuilding. Due to the heavy combat of June–July 1944, a large number of Panthers with the 12th ss Panzer Regiment's Panther battalion needed to have battle damage repaired. The majority of the cases which required heavy repairs would have been tackled by the workshop platoon of the battalion. The relatively small amount of resources within this platoon and its proximity to the front made it unsuited for the large repair demands placed upon it.

According to the *Frie Gliederung* (free grouping) panzer division organisation of April 1944 onwards, the repair and recovery organisation for a Panther battalion was to consist of two parts, both of which fell under the command of the panzer regiment. The first was the workshop platoon, which was part of a larger regimental workshop company that split its resources between the Panther and Panzer IV tank battalions of a panzer regiment.⁶⁸ Within the workshop platoon for the Panther battalion there were four sub-groups: A main repair group, a replacement part supply group, a recovery group consisting of towing vehicles and lastly an armament and signals repair group.⁶⁹ The workshop platoon took on very difficult repair jobs that often took a long period of time, sixty work hours or more. Full penetrations of the hull and turret were repaired, as well as water damage present in Panthers that had been submerged. Repair and replacement of damaged turrets mechanisms, armament housings, transmissions, and engines was also conducted. The workshop platoon was separated into two tactical elements:

⁶⁸ Eric Lefevre, *Panzers in Normandy: Then and Now* (London: Battle of Britain International Ltd, 1983), 16–17.

The other Zugs of the *Werkstatt Kompanie* was for the Panzer IV battalion, the sister battalion in the two-battalion 1944 Panzer Regiment.

⁶⁹ Lukas Friedli, *Repairing the Panzers: German Tank Maintenance in World War 2* (Monroe: Panzerwrecks Publishing, 2010), 238.

stationary and forward. The mobile element worked in the assembly areas of the tank companies, aiding them in carrying out any jobs that were beyond their abilities. The stationary part of the workshop platoon stayed in the same place as long as possible. It carried out the very difficult repair work in a site specially chosen for its facilities, stability, and safety from enemy action.⁷⁰

The second part of the repair organisation was the light maintenance units organically attached to the Panther companies and headquarters staff company. These were placed under the command the panzer regiment's supply company as of April 1944, but had formerly been the responsibility of the battalion and company commanders. The new set-up as of April 1944 was designed to free up these officers for operational command duties. Because the administrative reorganisation took time, this new organisation was not in effect with the 12th ss Panzer Regiment during June–July 1944. At this time each Panther battalion had four identical companies. Under the new arrangement the supply company was to provide each with its own light repair group, led a by non-commissioned officer repair leader. Each of these light groups provided very basic maintenance in cooperation with the panzer crews.⁷¹ Directing these four light repair groups was a repair staff group, attached to the battalion headquarters but still under the command of the supply company. The repair staff group itself had four distinct groups within its own organisation. These were a recovery section, a spare parts section, a crane-equipped armament and signals repair group and a replacement crew for any of the above groups. The duties of the repair staff group were direction and relief of the company light repair groups and handling medium level repairs before the workshop platoon had to get involved.⁷²

The remainder of the supply company within the panzer regiment was focused on its primary logistical mission. Without its supply deliveries all combat and repair operations would cease. The delivery elements of the supply company were divided into three groupings while in the field: forward, main, and rear. The forward supply group attended to the daily needs of the four Panther companies and all their vehicles. This group was in constant contact with the repair

⁷⁰ Ibid., 56.

⁷¹ Ibid., 18. Outline of repair services within a Panther battalion.

⁷² Ibid., 48.



Destroyed 2nd Company SS Panzer Regiment 12 Panther Mark A being inspected by the Durham Light Infantry near Rauray, France, 27 June 1944. [© IWM (B 6046)]

staff group and light repair groups. The second, main supply group consisted of transport vehicles that carried fuel and new equipment from army-level depots back to the panzer regiment. The last group was a rear group, whose duty was supplying the needs of the workshop platoon.⁷³

If the front was fluid or a German division was retreating or surrounded, the job of the supply element was difficult if not impossible. The routes from rear supply depots could be severed and Allied units could be operating in German rear areas. The supply units could also be forced to rapidly withdraw to avoid capture or destruction, abandoning their duties in the process. Matters were made worse in Normandy due to all German transport movement having to occur in darkness. From dawn to dusk, Allied fighter bombers were ever-present. Roving groups of Allied fighters would even strafe individual vehicles and single soldiers if they were observed in the open.

For a German tank unit, losing a vehicle to a rear repair facility outside the division or returning it to the factory for a complete rebuild was equivalent to losing it completely. It did not know when a replacement vehicle would be sent forward, and months could and did pass for German armour units in Normandy between deliveries of replacement tanks. To quote Lukas Friedli from his work on German

⁷³ Ibid., 40–41.

tank maintenance in World War Two: “German commanders were loath to write off panzers and instead carried them on their backs ad infinitum, wary of sending them back to the homeland for fear they would never be replaced. As a result, dead lined vehicles would be dragged forward during an attack, and dragged backward during a retreat. Thus they stayed in repair much longer, and the myth was born that Panthers were significantly less mechanically reliable than Allied tanks.”⁷⁴

For the first part of June 1944 the repair workshop platoon for the 12th ss Panzer Regiment’s Panther battalion was located in Venoix, a western suburb of Caen.⁷⁵ Its locations during late June and the early part of July 1944 are not listed in the war diary.⁷⁶ It appears its organisation was unique. It is described as containing a recovery group, a motor and transmission repair group, a weapons repair group with a twenty ton portal crane and a transport staff group. All these groups were made up of experienced German Army reservists.⁷⁷ Reviewing the war diary entries, it appears the workshop platoon did not receive any Bergepanther recovery tanks. They made do with Famo half-tracks or utilised other Panthers to do the work of towing damaged or broken down Panthers.⁷⁸ No information is present on light repair units within the Panther companies and battalion staff company if any were present.

It was ideal for German tank maintenance processes that repair sites be located near the front lines, in a stable location and part of the supply network. It was often impossible to accomplish these three goals simultaneously.⁷⁹ If the front was moving, a German workshop platoon could not conduct its duties and move at the same time. Thus an entire day or several days was lost in tearing down, moving, and setting up. The damaged tanks also had to be moved, and that took time. The performance of the workshop platoon was

⁷⁴ Ibid., 8. Foreword by W. Auerbach.

⁷⁵ Stephan Cazenave, *Panzer Division Hitlerjugend. Volume 2. Panzer Regiment 12 Normandie 1944* (Paris: Maranes Editions, 2014), 190.

⁷⁶ VHAP, *Kriegstagebuch Nr.1 der I./SS-Panzer Regiment 12, 1944*. Szamveber, *Waffen SS Armour in Normandy*, 221, Appendix II. The commander of the Panther battalion workshop platoon at this time was SS-Untersturmführer Walter Schmidt.

⁷⁷ Meyer, *The History of the 12. SS Panzer Division*, 7.

⁷⁸ Ibid., 9. These were missing in returns of 1 June 1944 and were never delivered during the Normandy Campaign.

⁷⁹ Wolfgang Schneider, *Panzer Tactics: German Small-Unit Armour Tactics in WWII* (Mechanicsburg: Stackpole Books, 2005), 206.

also largely dependent upon irregular deliveries of spare parts, tools, and consumable supplies.⁸⁰ During 1944 new tank transmissions, engines, engine parts, road wheels, final drive assembly parts, and welding supplies were often slow to reach their destinations. All these factors were then added to repair time for an individual Panther, which made the performance of the repair organisations within the panzer divisions slow. Challenges such as in this in Normandy had nothing to do with the mechanical reliability of the Panther tank, but often stemmed from the bombed-out railway network in northern France.⁸¹ Sometimes unserviceable tanks could not be brought along and were destroyed by their own crews to prevent capture. During the German military's retreats of January 1945 after the failed Ardennes offensive, large numbers of abandoned Panthers would be inaccurately referenced in current works as examples of mechanical unreliability.⁸²

It also should be noted that the German Army and Waffen ss in the late war period were diminishing military forces. During 1944 and 1945 they were slowly losing the logistical, training, and repair systems to maintain and overhaul sophisticated weapons platforms such as the Panther. The supply and maintenance unit organisations mentioned in this article were how they would have appeared on paper. Allied combat action, lack of proper initial equipping and a total lack of replacement vehicles led to these organisations functioning with less than their war establishment in men and vehicles.

Supporting these diminishing military forces was an underperforming German war economy that could not make up the losses suffered by Panther battalions. It was impossible to re-equip the nine Panther battalions in France during August 1944, each theoretically equipped with seventy-nine Panthers. There were only 350 Panthers accepted from the factories that month.⁸³ This

⁸⁰ Lefevre, *Panzers in Normandy*, 15–17. The organisation that had basic spares, ammunition, and fuel and could help with basic maintenance was the *Versorgungs Kompanie* (supply company), which was part of the panzer regiment.

⁸¹ Jarymowycz, "The Quest for Operational Maneuver in the Normandy Campaign," 297–298.

⁸² Zaloga, *Panther versus Sherman*, 30–31. Zaloga accurately claims twenty of forty-seven Panthers examined by Allied intelligence post-Battle of the Bulge in January 1945 had been destroyed by their own crews due to their inability to recover the tanks. But he does not mention if battle damage was a factor with these wrecks, or the conditions of the retreat that had led them to be abandoned.

⁸³ Jentz, *Germany's Panther Tank*, 122.

production could not match the wastage rate on the Normandy front; never mind the Eastern Front and Italy. Due to the damaged railroad system in northern France, even getting new Panthers to units in combat was a challenge.⁸⁴

Canadian battalion sized armoured regiments in Normandy were authorised a smaller number of battle tanks than German Panther units. However, the percentage of tanks that were serviceable in Canadian armoured regiments was higher than those in the Panther battalions. This gap grew as the units of the German Army and Waffen ss became even more depleted by late summer 1944. The returns of the 2nd Canadian Armoured Brigade for the period June–July 1944 report reflect large numbers of serviceable tanks. These numbers remain constantly high despite occasional catastrophic losses, such as those suffered by the 6th Canadian Armoured Regiment at Le Mesnil-Paltry on 11 June 1944.⁸⁵

What allowed such a large number of Canadian tanks to remain in action despite losses to enemy action and inevitable mechanical failure? There were four main reasons. First, the tank models in question had acceptable levels of automotive reliability. Second, large road moves that caused automotive breakdowns did not occur in the limited area of the Normandy bridgehead. Third, the Canadian Armoured Corps could backload unserviceable tanks that were beyond the capabilities of the light aid detachments in armoured regiments. They would be repaired by separate, effectively-run repair facilities in a stable environment. Fourth, a specialised tank delivery regiment, the 25th Canadian Armoured Delivery Regiment (25th CADR), was dedicated to delivering new and repaired tanks.⁸⁶

These factors did not ensure that a Canadian armoured regiment on the front line was always at 100 percent of its authorised tank strength, but it did give the appearance that their tanks never broke

⁸⁴ “Panther Allocations 1944,” *Panther1944.de*, available: <http://www.panther1944.de/index.php/en/sdkfz-171-pzkwfwg-panther/truppenteile/panther-zuweisungslisten/panther-zuweisungsliste-1944>, [accessed 2 October 2015]. German military archive source: BA-MA Friedberg i Br. Bestand RH 10. Panther battalions rarely received deliveries of new tanks in contrast to Allied tank units. The 12. SS Panzer Regiment’s Panther *abteilung* was allocated eleven tanks on 25 October 1944. It has previously had its last allocation dispatched on 7 June, which consisted of thirteen Panthers. These only arrived on 6 July 1944.

⁸⁵ Terry Copp, *Fields of Fire: The Canadians in Normandy* (Toronto, ON: University of Toronto Press, 2003), 76.

⁸⁶ Friedli, *Repairing the Panzers*, 8. Foreword by W. Auerbach

down. A severely damaged or disabled Sherman could take vital time away from the light maintenance units within the front line armoured regiments. Freeing them up from difficult time consuming work allowed them to focus on the quick maintenance of a larger number of tanks. Canadian tank recovery and repair units under Royal Canadian Corps of Electrical and Mechanical Engineers (RCEME) command in August 1944 were largely separate from the armoured regiments. Different levels of the Canadian Army's vehicle repair and recovery system were referred to as "lines." These "lines" of maintenance consisted of RCEME units that tackled escalating levels of repair work on vehicles. Breakdowns and non-severe battle damage could be taken care of by second line workshops. Third line was for the most intense tasks requiring time, resources, and a stable location to complete repairs. These jobs consisted of fully rebuilding and reconditioning tanks. Since it was impossible to send a Sherman or Firefly back to the factory for a rebuild, overhauls had to be carried out in France and Belgium.

As an example, a 22nd Canadian Armoured Regiment tank in the summer of 1944 could be serviced by multiple repair units, or lines, depending on what type of repair was needed. First line maintenance at the regimental level was the attached 84th Light Aid Detachment. Second line at the divisional level consisted of the 4th Armoured Brigade Workshop. Third line repair facilities consisted of the Number 4 Armoured Troops Workshop and 2nd Tank Troops Workshop at the corps level. The final fourth line assets at the army level consisted of the Number 2 Recovery Company and the Number 2 Advanced Base Workshop.⁸⁷

Once repairs were completed, the 22nd Canadian Armoured Regiment tank began its journey back to the front. If it was repaired by third line assets it would be signed over to E Squadron of the 25th CADR, which was the 2nd Canadian Corps rear delivery squadron. Past this point the tank could be delivered to either one of the two 25th CADR forward squadrons in Normandy at this time. These squadrons would then push the tanks forward to the armoured regiments.

⁸⁷ Murray C. Johnston, *Canada's Craftsmen at 50: The Story of Electrical and mechanical Engineering in the Canadian Armed Forces* (Borden, ON: The Guild of the Electrical and Mechanical Engineering Branch Charitable Trust, 2008), 327, Appendix 5.

Once they received new or repaired tanks, all 25th CADR squadrons fed them into sophisticated tank certification circuits. Essentially this was a circle where a tank entered and went through successive stations before it was declared operational and fully kitted out. This meant it was fully fuelled, its armament was operational, radios and other vital kit items were present, and the ammunition was fully stocked. Lastly, each Canadian tank required a full five man crew. Crews could consist of new replacements, personnel returning to their armoured regiment, or crews from broken down, destroyed, or damaged tanks. The 25th CADR and its multiple squadrons were exclusively responsible for Canadian Armoured Corps personnel replacements, and took possession of these soldiers shortly after they landed in Normandy. Thus the tanks delivered to armoured regiments were not just new or repaired, but fully armed, fuelled, kitted out and manned by fresh crews. Large tank inventories in the two forward 25th CADR squadrons in Normandy, often nearing a hundred tanks, reflected the efficiency levels of all repair and delivery assets involved.⁸⁸

The 25th CADR's C Squadron was effective at delivering tanks to the three armoured regiments of the 2nd Canadian Armoured Brigade that it was responsible for. Due to its rapid delivery rate, the regiments operated a very large percentage of their total authorised vehicle establishments. The monthly averages of serviceable M4 75mm Shermans for June–August 1944 were 82, 86, and 73 percent of their authorised establishments. The averages for serviceable Sherman Fireflies are lower, with returns of 50, 57, and 59 percent.⁸⁹ Given the limited number of Fireflies and the fact that they were prime targets for German forces, the latter returns are adequate. The main reason behind these adequate percentages was the effectiveness of the 25th CADR squadrons, the high production rate of second and third line repair facilities and a healthy supply of factory fresh tanks. D Squadron of the 25th CADR, responsible for the 4th Canadian Armoured Division's regiments, was also very efficient. The total of new and repaired tanks delivered to the four regiments it was

⁸⁸ Library and Archives Canada (LAC), *25th Canadian Armoured Delivery Regiment B Squadron War Diary*, RG24 Volume 14,276, File 944/C 01/45 – 05/45.. T-12746. On 4 May 1945, the squadron had an inventory of sixty fit tanks and thirty-three unfit tanks for a total of ninety-three tanks. This squadron was responsible for the needs of the 1st Canadian Armoured Brigade.

⁸⁹ Roman Jarymowycz, "The Quest for Operational Maneuver in the Normandy Campaign," Appendix E, 336–338.

responsible for in the months of August, September, and October 1944 were 118, seventy-nine, and 105 respectively.⁹⁰

The Canadian Army repair, replacement, and recovery system was a powerful asset and one that has received little attention in Second World War Canadian military history. It allowed Canadian Armoured Corps units to take serious losses and remain capable of offensive action. The German Army and Waffen ss in France did not have a separate organisation of repair workshops, nor did a specialised tank delivery regiment exist. They simply held onto each panzer for dear life, hoping enough spares and other replacement items would arrive to avoid the onset of cannibalisation.

In conclusion, the Panther tank was not a perfect model of reliability, but in contrast to the arguments of some current works, it was far from non-functional. A close study of the war diary of the 12th ss Panzer Division's Panther battalion in the period June to July 1944 suggests a number of limited conclusions. During its combat deployment in Normandy the tank displayed an acceptable level of automotive reliability. What 12th ss Panthers were unserviceable during this period were out of action mainly due to battle damage, not mechanical failure. Whenever a number of these vehicles went into combat, Anglo-Canadian forces went to extraordinary lengths to destroy them, writing off many and leaving others battle damaged. The repair and recovery assets within the battalion workshop platoon were unequal to the task asked of them, and the battalion itself received few replacement tanks.

In the period studied in this article, 6 June to 11 July 1944, the "Hitlerjugend" Panther battalion was on the front lines for thirty-five days. Of these thirty-five days, the battalion faced intense combat for twelve. During these twelve days, it lost thirty-three Panthers as total write offs and twenty-two to battle damage. Nearly five Panthers were knocked out each time the battalion's companies made contact with Anglo-Canadian forces. Out of an authorised strength of seventy-nine Panthers, it never had more than sixty-six tanks on hand. The average daily number that was serviceable was thirty-five.

Prior to combat in Normandy, the battalion's vehicles demonstrated their automotive reliability by completing a 140

⁹⁰ LAC, *25th Canadian Armoured Delivery Regiment D Squadron War Diary*, RG24 Volume 14,278, File 944/E 03/43-10/44. T-12748. A Canadian armoured regiment had an establishment of 72 tanks in May 1945.

kilometre road march in difficult conditions. A large number of tanks took part in the 8 June 1944 night attack against the village of Bretteville L'Orgueilleuse, verifying that a majority of the Panthers completed the march. Secondary sources containing data on Panther unit strength returns supply correct, but misleading information. Columns titled “short-term repair” and “long-term repair” suggest they were there due to mechanical faults. This was not the case for the majority of tanks within the case study unit in this article. During its first month of combat, the Panthers of the 12th ss Panzer Regiment were placed in challenging combat situations, facing Allied forces that had large material resources and that were becoming more tactically proficient daily. The opposing First Canadian Army in Normandy had a much more effective system in place to replace broken, damaged, and destroyed tanks with new operational ones. Starved of new replacement tanks and forced to conduct repairs near the chaos of the front lines, the German repair and recovery system in comparison was a model of poor performance.

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ABOUT THE AUTHOR

Arthur Gullachsen is a PhD Candidate in the University of Western Ontario History Department. A Regular Force member of the Canadian Forces, Captain A.W. Gullachsen is currently on a three-year post graduate training program to receive a PhD in History from the University of Western Ontario. His dissertation topic is the replacement of personnel and equipment losses in the First Canadian Army in Northwestern Europe, 1944–45.