# The rocket-firing Typhoons in Normandy:

## Two major actions

By Dr Alfred Price

A film sequence that seems to be almost obligatory for any TV documentary on the 1944 Battle of Normandy is the one that shows a squadron of rocket-firing Typhoons pealing off in succession as they enter their steep attack dives. Cut to the camera gun film taken from a fighter-bomber, showing its rockets streaking away leaving dense trails of smoke. Before the rockets reach the ground the aircraft pulls out of its dive, leaving the watcher to assume they hit their intended target. But is it likely they did so?

As anyone who has studied the subject will know, hitting a small target like a tank from an aircraft is difficult enough even using a modern high-velocity unguided rocket. Could it have been any easier during the Second World War, with the relatively low-velocity weapons that were then available?

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In 1943 the three-inch rocket projectile entered service in RAF. It was a crude weapon. The body consisted of a three-inch diameter cast iron pipe, which housed the cordite rocket motor and carried the four cruciform stabilising fins at the rear end.

The variant of the rocket originally intended for use against armoured vehicles was fitted with a 25 lb armour-piercing solid steel warhead. For use against ships, a quite different 60 lb high explosive semi-armour piercing warhead was also developed, containing 17 pounds of high explosive. Test revealed that the solid shot warhead was not very effective against land targets, though its stable underwater trajectory made it an effective weapon for use against ships and U-boats. Conversely, and perhaps fortuitously, the high explosive semi-armour piercing warhead was found to be the more effective than the solid shot weapon against tanks and other vehicles.[1]

Fitted with the semi-armour piercing warhead the rocket projectile weighed 91 pounds, and during operations over Normandy the Typhoon carried eight of these weapons on external launchers mounted on the outer wing panels. After launch the rocket projectile accelerated to a velocity of about 1,600 feet per second in about 500 yards, in addition to the speed of the aircraft. The motor then burned out and thereafter the weapon coasted towards the target gradually losing speed due to air resistance.[2]

At the time of the invasion of France on 6 June 1944, the 2nd Tactical Air Force possessed fifteen squadrons of Typhoons.[3] These were committed to action on a large scale, and during the actions that followed rocket projectiles achieved great prominence.

When striking at a defended target, the preferred tactic was to enter a 60° dive at about 8,000 feet (2,440 m). All eight projectiles were fired in a single salvo as the Typhoon passed through 4,000 feet (1220 m), at a slant range of about 1,700 yards (1,550 m).[4] After firing its complement of rockets, the aircraft was to pull into a zoom climb to take it beyond the range of automatic flak weapons as quickly as possible.

Against targets with light defences, the preferred tactic was to enter a 25° shallow dive at 3,500 feet (1060 m). The eight rockets were then ripple fired as the aircraft passed through 1,500 feet (460 m), at a slant range of about 1,000 yards (915 m) from the target.[5]

**The shortcomings of the three-inch rocket**

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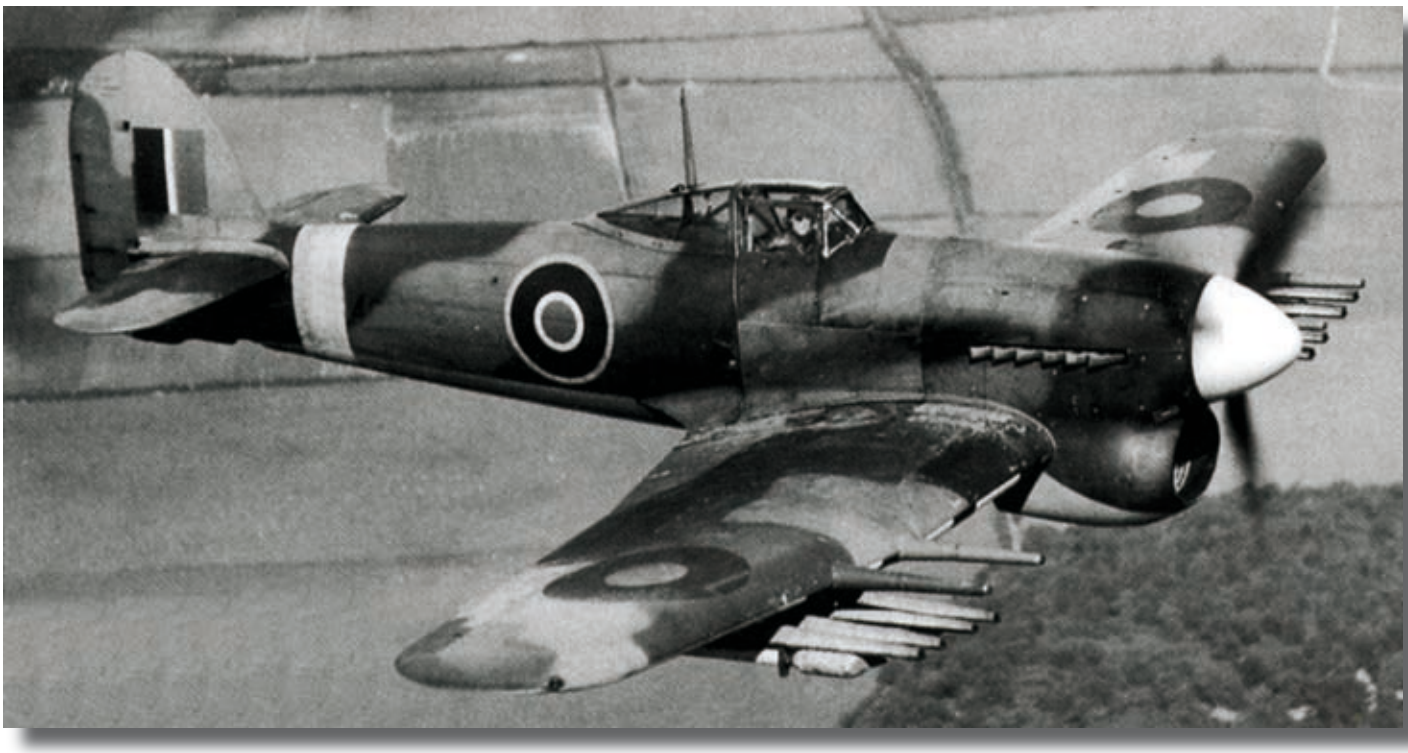
The three-in rocket could not be considered a 'user-friendly system'. Pilots had to judge their firing range by eye to within quite fine limits. A 150 yards error in firing range caused the rockets to impact 15 yards short of the target or a similar distance past it. Moreover, immediately after launch the fins at the rear caused the projectile to weathercock and align itself with the airflow. Thus if the aircraft had sideslip on at the time of launch,



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or was pulling 'G', that caused inaccuracies. Four degrees of sideslip produced a 50-yard sideways error at a firing range of 1,000 yards. If the aircraft was pulling 2 g at the time of firing, the missiles would impact about 30 yards short of the target. Unless allowance was made for it, a 20-mph side wind created an error of 33 yards in line.[6] Any of those errors was sufficient to cause projectiles to miss the target vehicle by a sufficient margin for it to escape serious damage.

If the Typhoon was under fire at the time of the attack, that distraction would compound the projectile's inaccuracies. A report on the results of operational rocket attacks on ground targets during April and May 1944 concluded that under combat conditions the 50 per cent zone for the rockets was 75 yards. That meant that the chances of an eight-rocket salvo securing a single hit on a tank with an area of 200 square feet, was about 0.7 per cent.[7]

**The Battle of Mortain**

In assessing the overall effectiveness of the rocket projectile, however, it is necessary to consider the effect of the weapon on enemy planning

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and morale. For two months after the D-day invasion, German armoured units in Normandy never attempted any major offensive action. Undoubtedly the fear of large-scale air attacks by Allied fighter-bombers was a major factor causing this timidity.

Everything changed during the early morning darkness of 7 August 1944, when elements of 1 SS Panzer, 2 SS Panzer, 116 Panzer and 17 SS Panzer Grenadier divisions launched Operation Luettich. This powerful thrust was aimed at the exposed left flank of US troops advancing rapidly southwards after their breakout from the Cherbourg Peninsular. The aim of the German offensive was to reach the sea at Avranches, and thereby sever the US supply line.[8]

Luftwaffe General Alfred Buelowius, the commander of Jagdkorps II controlling all Luftwaffe fighter and fighter-bomber units in northern France, was ordered to make a maximum effort to support the attack with bombing and strafing attacks on the US positions. His fighters were then to provide cover for the advancing German troops and drive away Allied fighter-bombers. Buelowius promised up to three hundred sorties to support the attack.[9] At every point, however, his force had been given a very ambitious commission.

At dawn the Mortain area was shrouded in mist, allowing the attackers to advance slowly despite stubborn resistance from US ground forces. One problem the German troops did not yet have to face, however, was that of attack from the air. During the late morning the mist cleared, and the Typhoons arrived shortly afterwards.

In his post-war despatch Air Marshal Arthur Coningham, AOC 2nd Tactical Air Force wrote[10]:

*"It was agreed . . . that the Typhoons, armed with rocket projectiles, of the Second Tactical Air Force, under the local control of AOC 83 Group, should deal exclusively with the enemy armoured columns, while the American fighters and fighter-bombers should operate further afield to prevent enemy aircraft from interfering with our air effort and, in addition, to destroy the transport and communications leading up to the battle area . . ."*

That left the 18 Typhoon squadrons now in Normandy a free hand to engage the German columns packing the roads leading into the battle area.

Shortly after noon the commander of No 121 Wing, Wing Commander Charles Green, returned after leading an armed reconnaissance over the battle area by six Typhoons. He reported seeing a concentration of enemy tanks and motor transport at St Barthelemy north of Mortain. Within minutes the first two squadrons from No 121 Wing, loaded with rockets, were airborne and heading for the area. Their pilots found between 50 and 60 tanks and about 200 other vehicles lining the road between St Barthelemy and Cherence. The Typhoons began by knocking out the vehicles at the head and the tail of the column, to bring it to a halt. Then they set about those trapped in between. A shuttle-service was set up, with fresh squadrons of Typhoons arriving at 20-minute intervals.[11]

For the next 8 1/2 hours the German armoured columns came under almost non-stop pounding from relays of Typhoons. That day the Typhoon squadrons flew 69 missions with 458 sorties, of which 294 sorties were against targets in the Mortain area. Total munitions expenditure was 2,088 rockets and 80 tons of bombs.[12]

In the face of the Typhoon attacks, and stubborn resistance from the US 30th Infantry Division, the German advance ground to a halt. On the arrival of the fighter-bombers, the tanks pulled off the roads to hide beneath trees. The enforced halt gave time for US reinforcements to move into blocking positions. The German advance stalled, never to resume.[13]

In the event the Luftwaffe put up somewhat less than the promised 300 fighter sorties to cover for the German thrust. A mission at around 1400 hours involving six Gruppen of fighters, with probably more than a hundred Messerschmitt 109s and Focke Wulf 190s, set out for the battle area from airfields around Paris.[14] The fighters of the US IX Tactical Air Force carried out their blocking role with resolution, however. They intercepted the would-be raiders and, in the series of brisk skirmishes, losses were light on both sides. But the important point was that they scattered the German formation, and not a single plane reached its objective. A further attempt by the Luftwaffe to reach the battle area later in the day, involving fighters drawn from five Gruppen, suffered a similar rebuff.[15]

At 1740 hours that day Luftwaffe Colonel von Scholz was forced to report apologetically to 7th Army Headquarters: "Our fighters were hard pressed by enemy fighters from the moment they took to the air. They could not reach the target area."[16].

Describing the action, the daily report of XLVII Panzer Corps complained that:

*"Continuation of the attack during the midday hours was made impossible because of enemy air superiority"*[17]. The report continued: *"The attack was bogged down since 1300 hours because of heavy enemy fighter-bomber operations and the failure of our Luftwaffe."*[18]

*Finally the Typhoons couldn't find any more Panzers so they bore down on us and chased us mercilessly. Their shells fell with a terrible howl. One fell right next to a comrade of mine, but he did not get hurt. These rockets burst into just a few big pieces of shrapnel, and a man had a chance of not being hit*

Werner Josupeit, an NCO with 2nd SS Panzer-Grenadier Regiment, described how it felt to be on the receiving end of the Typhoon attacks:

*"The fighter-bombers circled our tanks several times. Then one broke out of the circle, sought its target and fired. As the first pulled back into the circle of about twenty planes, a second pulled out and fired. And so they continued until they had all fired. Then they left the terrible scene. A new swarm appeared in their place and fired all their rockets . . . Black clouds of smoke from burning oil climbed into the sky everywhere we looked. They marked the dead Panzers . . . Finally the Typhoons couldn't find any more Panzers so they bore down on us and chased us mercilessly. Their shells fell with a terrible howl. One fell right next to a comrade of mine, but he did not get hurt. These rockets burst into just a few big pieces of shrapnel, and a man had a chance of not being hit."*[19]

A battalion commander who fought with the 2nd SS Panzer Division in Normandy told this writer: "Your fighter bombers simply nailed us to the ground." To emphasise the point he pressed his thumb hard against the top of the table. He then repeated a catch phrase coined by German soldiers to sum up the air situation there: "If the aircraft above us are camouflaged, they are British. If they are silver, they are American. And if they aren't there at all, they are German!"

During the Mortain action the advancing German troops had relatively poor cover from AA weapons. Only three Typhoons were shot down, and one pilot was killed. Typhoon pilots claimed 84 enemy tanks destroyed, 35 probably destroyed and 21 damaged.[20] They also claimed 112 other vehicles destroyed or damaged.

Afterwards Allied investigators made a ground search of the Mortain area, which found the remains of only 43 German tanks. Of those, 19 were assessed as having been destroyed by ground anti-tank weapons, seven by air-launched rockets, two by bombs and four to causes that could not be assessed. Eleven tanks had been abandoned intact, or had been destroyed by their crews to prevent their capture.[21]

What was the reason for the discrepancy between each side's figures? Over the battle area the pall of smoke and dust made accurate damage assessment almost impossible. It was probable that some tanks in conspicuous positions were claimed more than once. While it is possible that the German army recovered some tanks from the battle area, it is unlikely that many of these had been attacked from the air. Usually a direct hit from a bomb or an air-launched rocket damaged a vehicle beyond hope of repair.

A further important factor to consider is that the Typhoons' rockets would almost certainly have destroyed many more tanks, had the latter continued with their advance in the open.

**The effect on morale**

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advance. More severe than the physical damage was the effect of the attacks on the enemy troops' morale. An RAF tactical report on the action, based on reports from prisoners, stated:

*"Interrogation of prisoners has shown without question that German tank crews are extremely frightened of attacks by RP [rocket projectiles] . . . Crews are very aware that if an RP does hit a tank, their chance of survival is small. It is admitted that the chances of a direct hit are slight; nevertheless, this would hardly be appreciated by a crew whose first thought would be of the disastrous results if a hit was obtained."*[22]

German Army reports attributed most of the tank losses during the Mortain battle to air attack. That was despite the subsequent Allied finding that ground anti-tank weapons inflicted more than twice as many tank losses as those caused by aircraft. Part of the error was due to the inevitable confusion of battle, and the dense smoke columns rising from the many burning vehicles. Another factor was the understandable wish to blame the failure of the offensive on the ferocious Allied air attacks rather than the US ground forces (that meant the onus could safely be shifted to the Luftwaffe, which had made few friends in Normandy). Of course, the erroneous assessment did nothing to weaken the Typhoon's already formidable reputation in the minds of the German soldiers.

To quote once more from Air Marshal Coningham's post-war despatch on the 2 TAF part in the action:

*"It was the first occasion in Normandy when the air forces had the opportunity of striking a German armoured concentration. It was a situation which required speed and flexibility of air striking power. A fluid battle was imminent; in it the use of carefully planned concentrations of heavy bombers would not be practical. No fixed positions for planned obliteration*

*existed; it was a battle of armoured columns striking with speed in which might be a decisive concentration against our ground forces. The fighter-bombers of the Second Tactical Air Force adopted a 'shuttle service' of attacking formations, and as the day developed it was becoming clear that air history was being made. As the tempo of the attacks increased, so did the morale of the tank crews diminish, and at the height of the battle it was observed that the enemy were not waiting to stand our fire. The action of the Typhoons made many of them abandon their tanks and take cover away from them."*[23]

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**The Battle of the Falaise Gap**

The failure of Operation Luettich would leave the German Army units around Mortain in a difficult situation, and one that became progressively worse with each day that passed. Powerful US armoured forces drove south of Mortain, then swung northeast threatening to envelop the entire German force. Yet even as late as 11 August, Hitler was still ordering that his commanders were to resume their westward thrust to the sea as soon as possible[24]. Three days later even he saw that the situation was untenable, and he authorised a large-scale withdrawal. Between 12 and 21 August that withdrawal quickly developed into a rout, as German units sought to fight their way out of the pocket and reach relative safety on the east bank of the River Seine. As the units attempted to move east, they were subject to almost incessant air and artillery attacks. Large numbers of troops escaped from the pocket, but they were forced to leave behind much of their heavy equipment.

After the action the operational research sections of 21st Army Ground searched the area between the Falaise pocket and the German crossing points at the Seine, and recorded details of the tanks and other vehicles that were destroyed and abandoned there. Those results were set down in a detailed analysis of the results of the air attacks during the Falaise Pocket action.[25]

The searchers found 667 German tanks, self-propelled guns and armoured vehicles left behind. They did not claim to have found every enemy vehicle in the area, and it is likely that many were missed in the narrow lanes, orchards, farmyards and woods that occupied much of the area. Of the total found 385 vehicles, or just under 60 per cent, were examined to determine the reason for their having been left behind.[26]

The size of that sample was large enough to give a reasonable pattern of the effectiveness of the various types of weapon used by the Allied air forces: 385 armoured vehicles represented roughly the complement of two full-strength Panzer Divisions. By that stage of the battle some German divisions were down to nearly 60 per cent of their establishment of armoured vehicles, so the 385 came closer to the complement of three divisions rather than two.

The causes of the abandonment of the 385 armoured vehicles, with the causes of their destruction if applicable, were as follows:[27]

| Number | Percentage |
|---|---|
| 14 | 3.6 Rockets |
| 4 | 1.1 Bombs |
| 21 | 5.3 Machine gun or Cannon fire from the air |
| 148 | 39.5 Destroyed by crew to prevent capture |
| 121 | 31.5 Abandoned undamaged |
| 77 | 20.0 Other causes |

The two largest categories in the above table are significant: those armoured vehicles destroyed by their crews to avoid capture, and those that were abandoned undamaged. Together these amounted to 269 vehicles, or 71 per cent of the total. The great majority of those vehicles had to be left behind

because the Germans troops lacked the fuel to move them. Most of them spent the land battle stationary under camouflage, and when the retreat began they had to be left behind.

The 21 vehicles knocked out by machine gun or cannon fire from the air were lightly armoured scout cars or half-tracks; 87 of these vehicles were examined, of which the 21 represented just over 24 per cent. As was to be expected, no tanks or self-propelled guns were recorded as having been knocked out by machine gun or cannon fire from the air.[28]

The first thing to come out of the above table, once again, is the near-ineffectiveness of the three-inch rocket in direct attacks on armoured vehicles. This weapon accounted for only 14, or 3.6 per cent, of those examined. That was a meagre total, considering the number of Typhoons involved in the action.

From the many German accounts of the land battle, however, there can be no doubt that their troops in Normandy suffered greatly from the Allied tactical air forces. Although the direct air attacks on the German armoured vehicles were not very effective, the indirect effects of the attacks were powerful indeed.

During the 21st Army Group ORS count, a total of 6,656 German lorries and cars were found abandoned. Of these 1,361 were examined and categorised, and the causes of these losses was as follows:[29]

| **Number** | **Percentage** |
|---|---|
| 6 | 0.4 Rockets |
| 52 | 3.8 Bombs |
| 377 | 27.85 Machine gun or Cannon fire from the air |
| 27 | 2.05 Destroyed by crew |
| 502 | 37.05 Abandoned undamaged |
| 397 | 29.0 Other Causes |
| 1,361 | 100 *Total* |

An effective way of preventing a Panzer division from operating was to shoot up the soft-skinned lorries which brought up its vital supplies of fuel and ammunition. The tactical air forces caused considerable mayhem amongst these. There again the rockets were not all that successful. The bombs did slightly better, but even so they accounted for less than 4 per cent of the lorries and cars examined. Machine gun and cannon fire were the most effective of the aerial weapons in this context, though they accounted for only 28 per cent. It was however a commonly used tactic for fighter-bombers to concentrate on the vehicles at each end of the convoy, to box in those in the middle. So it is probable that fighter-bombers were responsible for the loss of somewhat more vehicles than the above figure would suggest. Vehicles stuck in traffic jams would have been listed under the 'abandoned undamaged' or 'destroyed by crew' headings.

To sum up: machine gun bullets and the cannon shells aimed at the soft-skinned supply vehicles played a major part in inhibiting the operations by the Panzer divisions during the Battle of Normandy. When Allied ground forces broke through the German line and forced the German Army into a full-scale retreat, large numbers of armoured vehicles had to be left behind for want of fuel.

Due to its inherent inaccuracies, the three-inch rocket projectile was barely effective against small targets like tanks or individual vehicles. The weapon destroyed relatively few of them. Yet the effect of the rockets on the morale of tank crews, particularly those lacking combat experience, could be devastating. Moreover, throughout the Battle of Normandy, the presence of several squadrons of rocket-firing Typhoons imposed severe constraints on the German strategy for fighting an aggressive defence.

The 7 August 1944 has justly been called 'The Day of the Typhoon', in recognition of the part it played in halting a powerful thrust by elements of five Panzer divisions. Despite its failings, the three-inch rocket projectile also deserves to share of that credit.

**Typhoon Operations in Normandy — question of logistics**

*"The more I see of war, the more I realise how much it all depends on administration and transportation . . . It takes little skill or imagination to see where you would*

*like your forces to be and when; it takes much knowledge and hard work to know where you can place your forces and whether you can maintain them there."*
(Field Marshal Earl Wavell)

It required a robust and effective logistics organisation to support a six-squadron Wing of Typhoons in Normandy. The figures below give the planning requirement for a single day's operations in terms of fuel, oil and munitions.[30]

**The planning assumptions:**
• Each squadron held 18 aircraft, of which 12 were available for operations
• The daily sortie rate was 24 sorties per squadron
• Aircraft fuel capacity 150 Imp gal, 77 per cent used per sortie
• Oil requirement: 3.3 per cent by volume of the quantity of petrol
• Ammunition expenditure was 25 per cent per sortie
• Bomb expenditure was 100 per cent on 75 per cent of sorties
• Bomb types used: 40 per cent 1,000-pound bombs, 60 per cent 500-pound bombs
• Drop tanks not carried

**The logistics requirement**
• 6 squadrons flying 24 sorties per squadron per day equalled 144 sorties per day
• Fuel requirement: 144 sorties at 116 gallons of petrol per sortie equalled 16,704 gallons. Allowing an extra 5 per cent for wastage, the total daily fuel requirement was 17,537 gallons, which equaled 76 tons packed
• Oil requirement: 3.3 per cent by volume of the quantity of petrol, 579 gallons which equalled 2.3 tons packed

**Ammunition requirement**: Typhoon capacity was 576 rounds of 20-mm ammunition. So 144 sorties per day at 25 per cent expenditure per sortie was 20,736 rounds which equalled 9.3 tons

**Bomb requirement:** 144 sorties per day of which 75 per cent were bombing sorties.
1,000 pounders: 86 – 38 tons
500 pounders: 130 – 28 tons
Total bomb requirement: 66 tons

Total daily fuel, oil and munitions requirement: 153.6 tons

For Typhoons flying the same sortie rate in the rocket firing role on the same planning assumptions, the daily requirement was 135 tons.

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