CANSOFCOM PROFESSIONAL DEVELOPMENT CENTRE

INNOVATION AND DARING

THE CAPTURE OF EBAN EMAEL, 10 MAY 1940

COLONEL BERND HORN

THE CANSOFCOM PROFESSIONAL DEVELOPMENT CENTRE

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The mission of the Canadian Forces Special Operations Forces Command (CANSOFCOM) Professional Development Centre (PDC) is to enable professional development within the Command in order to continually develop and enhance the cognitive capacity of CANSOFCOM personnel.

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8. assist with the research of SOF best practices and concepts to ensure that CANSOFCOM remains relevant and progressive so that it maintains its position as the domestic force of last resort and the international force of choice for the Government of Canada.

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THE CAPTURE OF EBAN EMAEL, 10 May 1940

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COVER PHOTO: Survivors of Storm Detachment Granite after the assault, 11 May 1940
Bundesarchive, Bild 146-1971-011-27/Büttner

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FOREWORD

It is my pleasure to introduce the latest monograph created by the Canadian Special Operations Forces Command (CANSOFCOM) Professional Development Centre (PDC). This series remains an important forum in expanding the growing body of literature on Special Operations Forces (SOF) in general and Canadian Special Operations Forces (CANSOF) in particular. In this manner, those in the Command, as well as those external to it, can continue to learn more about SOF, particularly with regard to its strategic utility and in the case of CANSOF, its contribution to the Canadian Armed Forces and the Government of Canada.

This monograph, *Daring and Innovation: The Capture of Eben Emael, May 1940* is especially worthy of study as the event is a seminal example of, as the title describes, daring and innovation. The attack was a *coup de main* action that captured what the world perceived to be an impregnable fortress within hours. In fact, the actual objective of the mission, to knock out guns that could interfere with the actions of conventional units attempting to cross the Albert Canal in Belgium, was achieved within 15 minutes.

As such, this case study provides the details of how a small group of specially selected and specially trained individuals was able to accomplish the unthinkable. Their bold strike and seizure of Eben Emael is indicative of a number of core SOF attributes and principles of success. In particular, innovation and agility of thought allowed them to capitalize on new methodologies, technologies and approaches to war. Furthermore, maintaining secrecy, ensuring a solid plan that maintained simplicity and had contingency options, ensuring detailed rehearsals, utilizing speed and surprise,

as well as psychological dislocation of the enemy in the execution, all played an important part in the success of the attack.

Daring and Innovation provides an excellent case study that will allow practitioners and students of SOF to understand the successful employment and effectiveness of SOF actions. As always, I hope you find this publication informative. Additionally, it is intended to spark discussion and reflection. Please do not hesitate to contact the PDC should you have comments or topics that you would like to see addressed as part of the CANSOFCOM monograph series.

Dr. Emily Spencer
Series Editor and Director of Education and Research
CANSOFCOM PDC

INNOVATION AND DARING: THE CAPTURE OF EBAN EMAEL, 10 MAY 1940

Nervous tension filled the confined interior of the aircraft. The same scene was played out in eleven separate gliders spread across the nondescript airfield in the predawn darkness near the German / Dutch border. Heavily armed German *Fallschirmjägers* sat motionless in the tightly confined space of their narrow DFS-230 gliders. They ran their hands over their equipment in the dark, reassuring themselves that they had all the necessary tools and munitions to do their task.

The calm pre-morning stillness was suddenly shattered as the engines of the Junker (Ju)-52 transport planes sprung to life. The roar and shudder of the motors shook the large aircraft, which in turn sent vibrations through the thick tow rope attached to the gliders causing them to begin to rock. Then, suddenly, the gliders jerked forward as the tow ropes were pulled taunt.

The Ju-52s now began to rumble down the airstrip, straining to pick up speed while pulling their tethered charges. As the transport planes struggled to accelerate the gliders fell in line with their respective towing aircraft. The chain-rattling noise of the glider wheels accelerating to keep up with its slaved transport plane filled the fuselage, which wobbled and shook violently back and forth as it made its way down the airstrip. Then, after a sudden lunge into the air, the wheels went silent. But the silence was short-lived as the interior of the glider began to fill with the slapping and pulsating of the canvas material covering the fuselage. The noise and discomfort, however, would not last long. The distance to their

objective was relatively short and the transport planes climbed steeply to reach their required altitude before releasing the gliders.

Blind to all around them and feeling particularly vulnerable crammed into the DF-230 glider, the German *Fallschirmjägers* mentally reviewed their tasks. They had rehearsed the assault endlessly and felt well-prepared. However, they all knew, that in war, as the great German theorist Karl von Clausewitz had stated, even the simplest of tasks can become difficult.

Then without warning the lurching subsided. It was now eerily calm and quiet with only the rushing wind and gentle slapping of the canvas being audible. Nonetheless, the turbulent pitching and swaying remained threatening to make even the hardest sick.

In the cramped cockpit the glider pilots looked down and they could see on the distant ground a line of fire pointing the way to the objective. Once the Ju-52 transport planes attained 2,000 metres and their final release point, which was intended to be in German territory so as to maintain surprise and to ensure the aircraft engines did not prematurely warn the Belgian defenders, the tow ropes were cast off. The gliders now had to make the last 32 kilometres to the objective on their own. They began a gentle steady descent, but it soon transitioned into a series of hard, tight circles as the skilled, experienced glider pilots began a rapid and precipitous descent directly onto the objective.

The assault force inside the gliders tensed themselves for the landing. Without warning, the stillness of the flight was disrupted by the sounds of rounds ripping through canvas and the splintering of wooden frames. The violent eruption of noise was only momentary as the gliders made contact with the ground with a distinct thud and skidded across the grass at an alarming speed. The pilots quickly applied the hand brakes and the gliders came

to jarring halts throughout the confines of the Belgian Fortress of Eben Emael.

Without hesitation, the *Fallschirmjägers* exited the gliders through the rear doors and the front canopy. Although expecting to surprise their enemy, the attacking force was still shocked by the apparent disarray of their opponents and the substantive lack of initial resistance. Quickly capitalizing on their momentary advantage the assaulting detachments wasted no time in executing their tasks. Each detachment grabbed their explosives and dashed to their objectives. Time was of the essence. After all, on their shoulders seemingly rested the success of the invasion of France! The heavily outnumbered assaulting force was gambling that speed, innovation and violence of action would carry the day.

BACKGROUND

By 1939, despite Hitler's provocative moves, the Allies were hesitant, if not reluctant, to go to war. Germany's invasion of Poland, due to alliance guarantees, however, forced the issue. Nonetheless, there was little Britain and France could, or more accurately would, do. The German Army cut a swath of destruction through Poland, forcing the country to crumble in a little over a month. The use of combined arms, aptly titled "Blitzkrieg" that leveraged the marriage of tanks, armoured vehicles and close support aircraft, created an offensive capability empowered by speed, mobility and destructive power.

In the aftermath of the Polish victory, Hitler halted his war machine. Amazingly, the Allies had given up a golden opportunity to strike at, and defeat, Germany. Hitler had correctly gambled that the Allies would not act. As such, he had left his Western frontier practically undefended, utilizing second rate frontier troops to guard the border. He had taken 62 divisions, representing his best

forces, supported by 1,300 aircraft, for the attack on Poland. Once the conquest of Poland was completed, he ceased further offensive action. There was now a stalemate on the Western Front as Germany faced down Britain and France along the French border.

The "Phoney War" dragged on through the winter months. Then in April of 1940, German forces seized Norway. Few doubted that France and the Low Countries would be next. As such, it was only a matter of time before the conflict would hemorrhage, forcing yet another war on the scale of the Great War.

The Allies had apparently learned nothing in the intervening war years, or for that matter, from the invasions of Poland and Norway. They still clung to their First World War experience and doctrine and prepared for a replay of the Great War. They had spent much of the interwar years building formidable defences. The French built the Maginot Line in the 1930s, which was a series of fortifications that stretched along the eastern French border from Switzerland to Belgium. The Belgians in turn built defences along the Albert Canal. Between the French and Belgian defensive belt stood the Ardennes forest, an obstacle the Allies believed would be impenetrable by German forces. The Allies banked on the idea that the mix of concrete fortifications and dense forest would leave the Germans no choice but to once again swing to the North, as they had in the First World War, where the Allies would be waiting with their concentration of forces.

Indeed, Major-General F.W. Von Mellenthin later revealed, "In November 1939, the German plan of attack in the West was very similar to the famous Schlieffen Plan of World War I, i.e. the *schwerpunkt* [main point of effort] was to be the right wing, but swinging a little wider than in 1914 and including Holland."[1] All ten of Germany's panzer divisions, grouped under Army Group B, were assigned to this mission. Meanwhile, Army Group A was

responsible for penetrating the Ardennes and advancing up the line of the Meuse River with infantry, while Army Group C fought a defensive battle facing the French Maginot line.[2]

However, an unfortunate, or perhaps in the end analysis a paradoxically very fortunate blunder, by a German courier, changed the fate of the Allies.[3] General Heinz Guderian explained:

> A Luftwaffe officer courier who, contrary to standing orders, was flying by night with important papers containing references to the proposed Schlieffen Plan operation, crossed the Belgian frontier and was compelled to make a forced landing on Belgian soil. It was not known whether he had succeeded in destroying his papers. In any case, it was assumed that the Belgians, and probably the French and British, knew all about our proposed operation... This resulted in Manstein Plan now becoming the object of serious study.[4]

The Manstein Plan, devised by General Erich von Manstein, and favoured by many of the new breed of German generals who believed in the power of mobility and speed, still rested on the concept of three Army groups sweeping through the Low Countries and France. The difference, however, lay in the emphasis and location of the "*schwerpunkt*." The Manstein Plan put the emphasis on Army Group A. Manstein revealed:

> OKH [German Army Headquarters] in accordance with Hitler's directive of 9th October – to send a strong right wing of the German armies through Holland into Northern Belgium to defeat the Anglo-French forces it expected to encounter there together with the Belgians and Dutch. In other words, the decision was primarily to be sought by a strong thrust on the right wing… The real chance lay with Army Group A, and consisted in launching a surprise

> attack through the Ardennes – where the enemy would certainly not be expecting any armor because of the terrain – toward the lower Somme in order to cut off the enemy forces thrown into Belgium forward of that river. This was the only possible means of destroying the enemy's entire northern wing in Belgium preparatory to winning a final victory in France.[5]

And so, in a very risky gambit, Manstein proposed that the bulk of the panzer forces be sent through the confining Ardennes forests in a bold thrust that would catch the Allies by surprise and cut off their forces in the North, in Belgium and Holland. Army Group B, would swing through Belgium and Holland, much like the Schlieffen Plan of the First World War and draw the Allied forces away from the main blow in the Ardennes. These forces would then be cut off once Army Group A sliced through the Ardennes and reached the coast. Army Group C would continue to fight a defensive holding action facing the vaunted impregnable Maginot line.[6]

Major-General von Mellenthin emphasized the importance of the focus on the Ardennes. He explained:

> But the decisive factor was for that for the breakthrough between Sedan and Namur we had massed seven of our ten panzer divisions, of which five were concentrated in the Sedan sector. The Allied military leaders, particularly the French, still thought in terms of the linear tactics of World War I and split their armor among their infantry divisions... The whole campaign hinged on the employment of armor, and was essentially a clash of principles between two rival schools.[7]

German invasion of France, May 1940

The German gamble was risky. In May 1940, the Germans had 2,439 tanks, mainly light tanks, against a combined Allied strength of 4,204 tanks, many of which were superior in armour and armament to the German models. The Germans were also heavily outnumbered in other areas as well. They fielded 135 infantry divisions against the Allied combined strength of 151 infantry divisions. In artillery the balance sheet was even more lopsided with 7,378 artillery pieces for the Germans against 14,000 Allied pieces.[8]

Moreover, the Belgians had been busy since the end of the First World War preparing their border defences. General the Viscount Gort, the British Commander-in-Chief of the British Expeditionary Force (BEF), reported back to his headquarters in London on the eve of the invasion:

> The development of the successive defensive positions and switch lines behind the Belgian frontier was continued steadily till 10th May. By this date over 400 concrete 'pill-boxes' of varying size had been completed with over 100 more under construction, while work on the improvement of field defences, wire and other obstacles proceeded continuously on the original front and in the sector north of Armentières recently taken over from the French.[9]

In short, the Belgian plan for the defence of their country was to hold a delaying position on the Albert Canal long enough to enable the British and French expeditionary forces to deploy forward and assist with the controlled withdrawal of all Allied forces to the Dyle Line (or National Redoubt), which was the primary / main Allied defensive position covering Antwerp and Brussels. The delaying position, which was responsible for buying time to allow Allied forces to react and complete their necessary deployments, consisted of a forward line of outposts, with the exception of the 16 kilometre sector opposite Maastricht where the Albert Canal ran in close proximity to the Dutch border.

Here, near the Maastricht sector, the defences were based on the Albert Canal. This formidable entrenchment was cut deep and was approximately 107 metres wide. The obstacle had only three bridges that spanned the canal at Veldvezelt, Vroenhofen and Canne. The Belgian sector was defended by the 7th Infantry Division with three brigades deployed forward in brigade sectors supported by the guns of Fortress Eben Emael.[10]

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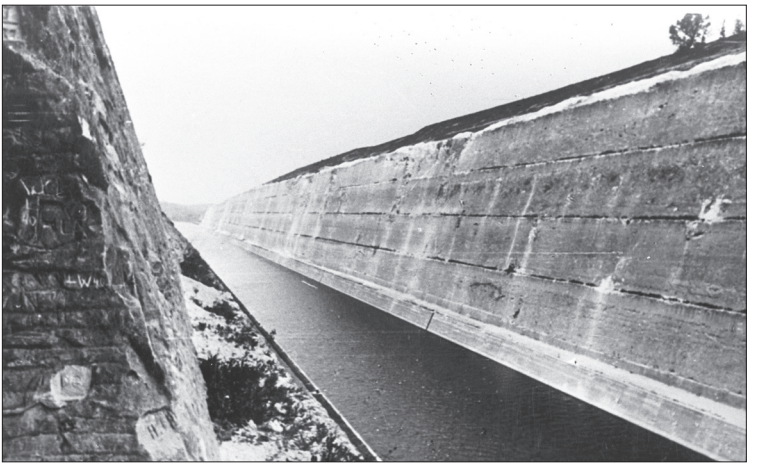

Albert Canal, May 1940

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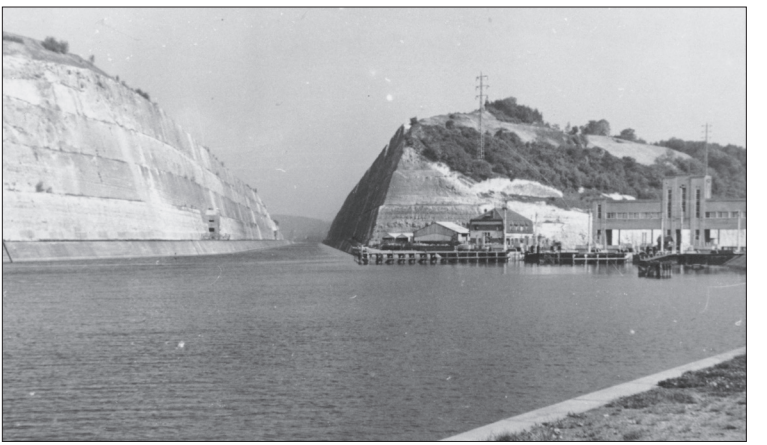
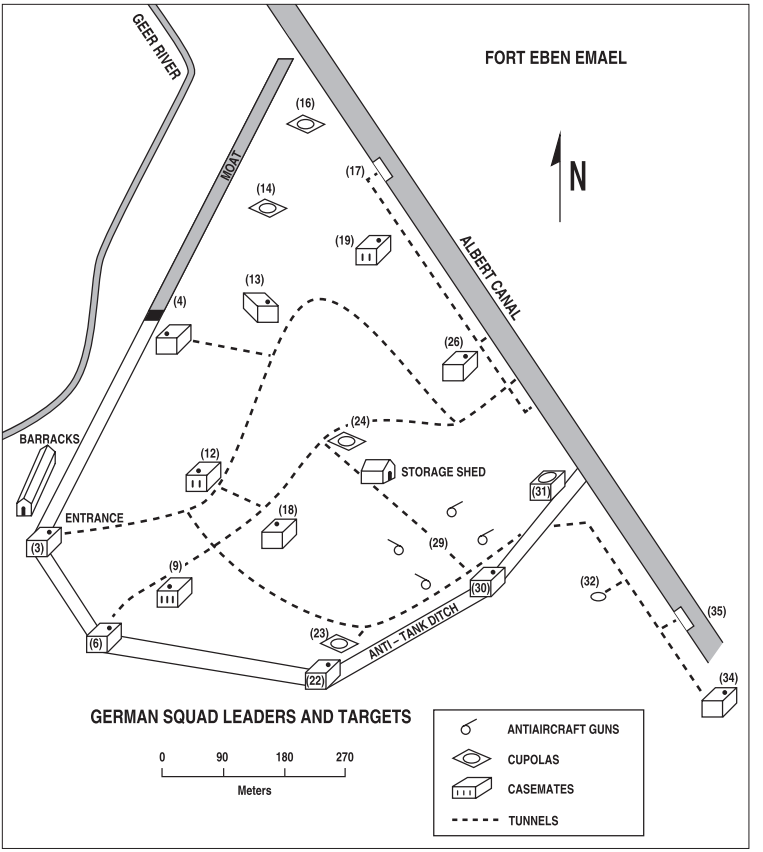


Albert Canal, May 1940. The fort is on the left.

The Belgians, if not the Allies in totality, perceived the fortress to be impregnable. The diamond shaped fort held a garrison of 1,322 personnel and it formed the "foundation" of the Belgian forward defensive line. Fort Eben Emael was built in 1934, in concert with the construction of the Albert Canal. Thinking they had learned the lessons of the First World War, the Belgians constructed the Fort by tunnelling into a rocky hill, hoping to thus avoid a repeat of the embarrassing defeat of their forts around Liege in 1914. As such, the living quarters, workshops and magazines were all located deep in the heart of the hill. Shafts housing ammunition lifts and a spiral staircase ran up through the rock to the heavy concrete gun emplacements on the surface. The gun emplacements themselves had reinforced concrete walls and ceilings that were approximately 1.2 metres thick. The fortress armament consisted of twelve 75mm guns in casements, as well as four 75mm and two 120mm guns in revolving armoured cupolas that were made of 15cm thick steel. Many of the casemates and cupolas also housed machine guns that provided anti-infantry fire on the surface. The artillery pieces covered the bridges and the outlying towns.

There were also five 60mm antiaircraft batteries situated at the south-east corner of the fort. The approaches to the fortress were equally impressive. The side of the fort closest to a predicted German assault was a steep 61 metre cliff that dropped into the canal. The other three sides were protected by deep entrenchments, barbed wire, and anti-tank ditches, all of which were covered by protective fire from dominating concrete bunkers.[11] There was an Achilles heel, however. The fort had no infantry fighting positions on the surface and, although the external approaches to the fort were covered by anti-tank obstacles and belts of barbed wire and minefields, with the exception of five rows of barbed wire constructed in strategic locations, the top of the fort was left as a grassy field.



Nonetheless, crossing the 107 metre wide canal itself would be problematic to any attacker. At each of the three bridges, immediate defences consisted of an infantry company position on the near bank of the bridge and a small post on the far bank. Embedded within the defensive position were four large concrete pillboxes. On the near side of the bridge, parallel to the road, was a bunker with an anti-tank gun. The remaining three bunkers, containing medium machine-guns, were spread along the embankment on the edge of the canal, one immediately below the bridge and one on each flank, approximately 500 metres distant. The bridge at Canne was an exception. Along this sector there was no embankment to

the canal so the anti-tank gun was positioned into a hillside about 100 metres behind the bridge on the near side.

Fearing a war in the offing, in 1938, Belgium began to prepare its bridges for potential demolitions. Unfortunately, in August 1939 a large bridge across the River Mass, in Liege, blew up by accident during a thunderstorm, when the electrical activity caused by the storm induced currents in the electrical firing system. As a result, the Belgians decided to replace electrical firing with safety fuse and detonating cord. This change of ignition made firing the demolitions in an emergency more time consuming and difficult.

The actual authority to demolish the three bridges over the Albert Canal was held at a high level. The two northern bridges were the responsibility of the Commander of the garrison at Lanaken. For the bridge at Canne, authority for firing was invested in the Commander of Fort Eben Emael. Ironically, neither of the two Commanders charged with ordering the destruction of the bridges were under command of the 7th Division, within whose sector the bridges lay. Both Commanders were connected by land line to the firing detachments, which were located in the main anti-tank bunker at each of the respective bridges. The firing parties, led by sergeants, were small. Nonetheless, to the Belgians, the entire firing system put in place seemed satisfactory since they believed they would have sufficient warning since the Germans had to cross 24-32 kilometres of Dutch territory prior to reaching the Albert Canal. As such, a surprise attack seemed impossible.

THE PLAN

Although the main German thrust, consisting of the bulk of its panzer force grouped in Army Group A, was to go through the Ardennes, the feint to the north, through Belgium and Holland by Army Group B, was instrumental in fooling the Allies so that they would commit their forces to that front. As such, central to

successfully drawing the Allies to the North was a rapid advance penetrating deep into Belgium. Therefore, neutralizing Fort Eben Emael and capturing the bridges across the Albert Canal intact were vital to the German plan of manoeuvre.

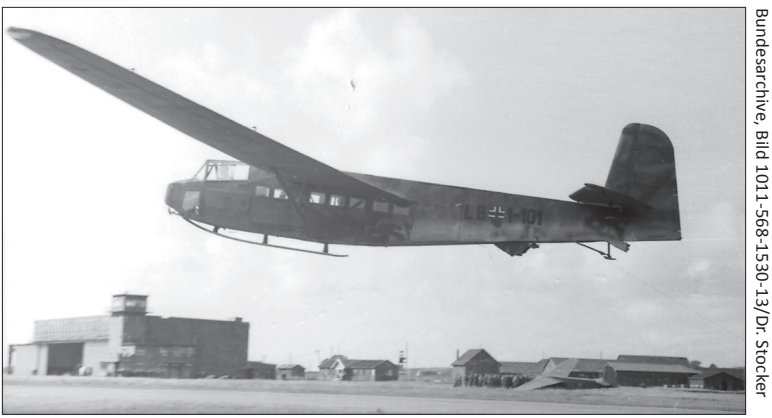
As such, Hitler gave General Kurt Student, the commander of 7 *Flieger* Division, Germany's *Fallschirmjäger* division, two fundamental missions for the invasion of France. The first mission was to seize a major airhead on the Allied defensive Dyle Line. The second mission was to capture Fort Eben Emael. Hitler directed:

> You will land near Maastricht on Fort Eben Emael with specially trained engineers and on the Albert Canal bridges with air infantry. The capture of Fort Eben Emael by us will prevent a flanking action against our crossings of the Maas [River]. Eben Emael is one of the strongest positions that the Belgians have. Their military experts consider it impregnable – against conventional ground attack. Timed simultaneously with landings on Eben Emael your paratroopers will take the bridges over the Albert Canal and prevent their destruction. The accomplishment of these two missions will enable [General Walther von] Reichenau [Commander 6th Army], after seizing his own crossings over the Mass, to link up with the paratroopers and then continue the drive into Belgium with his panzers.[12]

For Student, the Fuhrer's intent was clearly for the 7th *Flieger* Division to enable the German 6th Army to pass the Dutch and Belgian border defences "without delay." But a major issue was how to deal with Fort Eben Emael and the bridges crossing the Albert Canal and Mass River. A careful study of the problem revealed that the fort and bridges were well defended against ground attack but not against a direct assault from the air. In fact, the Fort had a flat surface and apart from artillery it had only two to three medium machine guns capable of firing on the surface of

the Fort, or in an anti-aircraft role. Therefore, it was susceptible to attack from gliders.

The idea to use gliders was a function of chance. In casual conversation with Hanna Reisch, a glider pilot, Hitler had learned that gliders were practically noiseless in flight. He seized on the point and directed that a study on the use of gliders for the invasion of France, specifically the break-in through Belgium, be made. Germany had a number of large freight gliders that had been developed in 1938 as cargo-carriers. The most recent trials demonstrated that these gliders could carry nine armed men and if released at approximately 2,400 metres they could easily glide the 32 kilometres to their objective. Importantly, in 1940, Belgian anti-aircraft defences used sound-location not radar. Therefore, if the gliders were released in the dark over Germany, they could potentially reach Belgium unseen and unheard.[13] "So the German command decided," First-Lieutenant Rudolf Witzig, one of the detachment commanders to participate in the assault on Fort Eben Emael, revealed "to use freight gliders, which could approach silently and invisibly in the half-light and which would moreover, possess a high 'surprise potential,' as they had never been used on such a scale as a weapon of war."[14]



Bundesarchive, Bild 1011-568-1530-13/Dr. Stocker

German DFS 230 Freight Glider.

Bundesarchive, Bild 1011-569-1579-14A

German Fallschirmjager practicing glider assaults.

German innovation went a step further. To deal with the formidable reinforced concrete bunkers, the Germans specifically developed a state-of-the-art demolition charge, the *Hohlladung*, which was considered a secret weapon. It was a hollow-charge, also known as a shaped charge, which was designed in its largest form as a 50 kilogram demolition capable of punching a hole of about 31 centimetres diameter through approximately two metres of concrete.[15]

As a result of a series of studies, Student accepted that airborne forces could carry out the missions. For the critical task of capturing the bridges across the Albert Canal and the impregnable Fort Eban Emael, Student began to assemble a task force consisting of parachute infantry, parachute engineers, tug aircraft and gliders.[16] He gave command of the task force, named Storm Group Koch after its commander, to Captain Walter Koch. The actual task force was formed at Hildesheim, near Hanover, in November 1939. It was made up of 1 Company, 1 Parachute Regiment and the Parachute Sapper Detachment of the 7th *Flieger* Division. Captain Koch broke his assault force into four detachments:

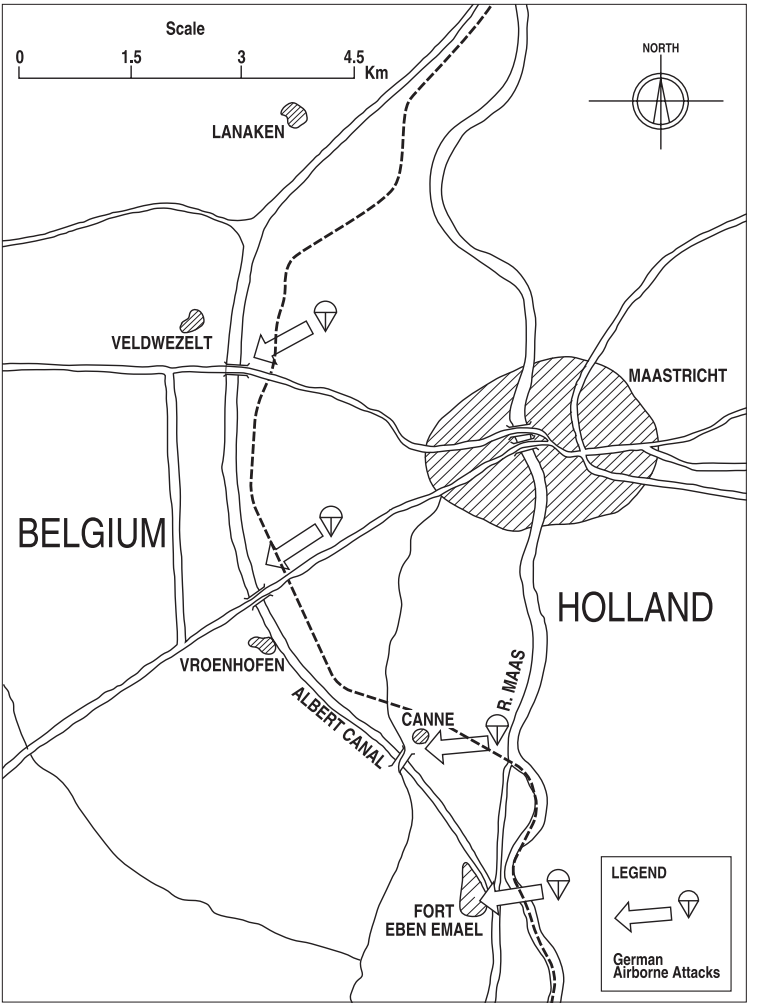
1. Storm Detachment Granite under command of First-Lieutenant Witzig, had a strength of 85 men. Its mission was to neutralize Fort Eben Emael and hold it until relieved by Army Sapper Battalion 51.

2. Storm Detachment Concrete under command of Lieutenant Schacht had a strength of 96 personnel, which included the task force command element. Its mission was to prevent the bridge at Vroenhoven from being blown and forming / defending a bridgehead until relieved by leading elements of the 6th Army.

3. Storm Detachment Steel under the command of First-Lieutenant Altmann had a strength of 92 men. Its mission was to prevent the bridge at Veldwezelt from being blown and forming / defending a bridgehead until relieved by leading elements of the 6th Army.

4. Storm Detachment Iron under Lieutenant Schächter had a strength of 90 men. Its mission was to prevent the bridge at Canne from being blown and forming / defending a bridgehead until relieved by leading elements of the 6th Army.

The overall assault had two major phases. The first phase consisted of capturing Fort Eben Emael and seizure of the bridges across the Albert Canal to prevent the Belgians from blowing them, as well as neutralizing the bunkers and securing bridgeheads of 300m radius at each objective. The Germans estimated that the shock of surprise would be fleeting, approximately lasting 10-15 minutes. After that point, they realized resistance would build. Therefore, they planned to achieve the first phase by H+45 minutes. The second phase was purely defensive, to simply hang on to all of their objectives.



Storm Group Koch objectives.

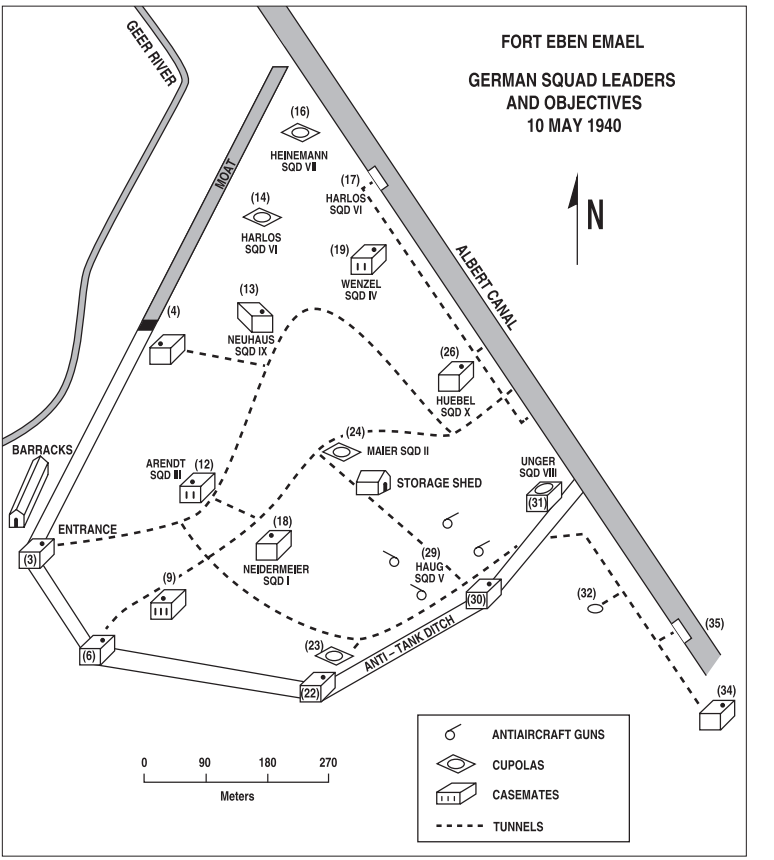
To add to the shock and dislocation of the Belgians, ten minutes prior to the real drop, dummy parachutists were to be dropped in the rear of the Belgian 7th Division to cause confusion and delay deployment of reserves. Finally, in order to achieve complete surprise no German air or ground forces were to cross the Dutch

frontier prior to the landings. Rather, 330 light bombers and Ju-87 Stuka dive-bombers were assigned to conduct supporting attacks against Belgian headquarters, reserves, and gun positions from H+15 minutes to H+80 minutes. German planners assessed that if all went well, the main German invasion force would link-up with the Koch Storm Detachment within four hours.

As such, the assault on Fort Eban Emael fell to First-Lieutenant Witzig. Based on aerial photos he decided to attack the northern tip of the fort with five detachments and the central section with four. Witzig quickly prioritized his actions. First, he deemed it essential to destroy the armament on top of the fort that could impede the landing of gliders and freedom of movement on the surface of the fort. Second, he realized it was of great importance to silence the guns that were trained on the three bridges. From aerial photographs he was able to ascertain that the steel cupolas were essential for observing artillery fire. Therefore, he decided destroying the cupolas, and thus rendering the artillery fire ineffective, was of initial importance. Finally, Witzig assessed that he would need to block and / or destroy entrances and exits to the Fort to seal up the garrison and deny the enemy the ability to counter-attack or reinforce the garrison.

Success depended on speed and violence of action to induce shock in the enemy. With only 85 men assigned to his task, his chances of survival against a spirited counter-attack were slim. At best, Witzig calculated that he would have no more than an hour before the enemy began to counter-attack. Yet Witzig had one major advantage. The *Luftwaffe* was able to attain blueprints of the Fort from a German subcontractor who had assisted in the construction of the fortification.[17] As such, Witzig knew exactly where all the large guns were located. As such, he broke his platoon into eleven detachments. He explained:

We were allocated 11 gliders for the job, and as the plan of campaign developed, it became necessary to divide the detachment into 11 sections of seven or eight men. Each section was to capture two emplacements or casemates and, in addition, to be equally ready to take over for any section out of action. Moreover, unlike other pilots, a glider pilot, who is in command up to the time of landing, cannot stand aside during the actual battle. So our pilots took their turn as sappers in the detachment and the section to which they were allocated, so that they would be reliable in action.[18]



Witzig went on to describe:

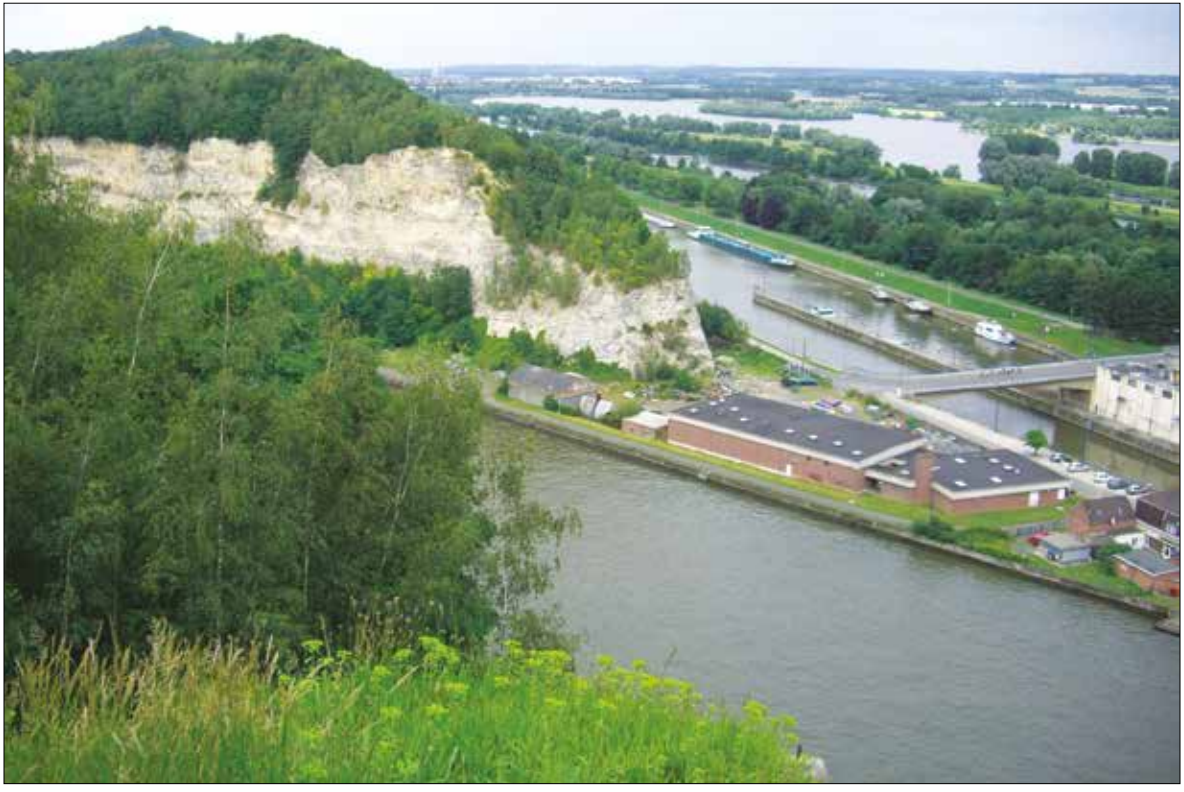
> In addition to flamethrowers and the collapsible assault ladders which we had built ourselves, the special equipment for the operation consisted chiefly of 21/2 tons of explosives, predominantly cavity charges, which were used for the first time at Eben-Emael for cracking the armoured domes. The 50-kg cavity charges, carried in two parts, were in the shape of hemispheres. They could penetrate armoured domes 25cm thick, and even where this armour was 28cm thick, it was likely that weapons and troops below would be put out of action by flying splinters. Where the armour was thicker still, several explosions in the same hole would be necessary. Even the smaller 12.5kg cavity charge penetrated armour of 12 to 15cm, and it was also suitable for precision blasting of loop-holes and heavy artillery. All charges were detonated by ten-second fuses.[19]

To assist with the defence of the Fort once it was neutralized, Witzig was also assigned a liaison officer from the *Luftwaffe* who would be responsible for acting as a forward air controller responsible for calling in close air support and resupply drops. In addition, the plan detailed the assistance / relief of Storm Detachment Granite by the 51st Engineer Battalion, 151st Infantry Regiment Group, 4th Panzer Division, at the earliest opportunity. They were responsible for crossing at Canne and providing direct support in the silencing of Fort Eben Emael and / or the relief of Witzig's detachment.

Those aware of the actual mission quickly realized that security was the very basis of success. First-Lieutenant Witzig explained:

> Our survival depended on taking the enemy by surprise. We were all made aware of this and drastic measures

B. Horn

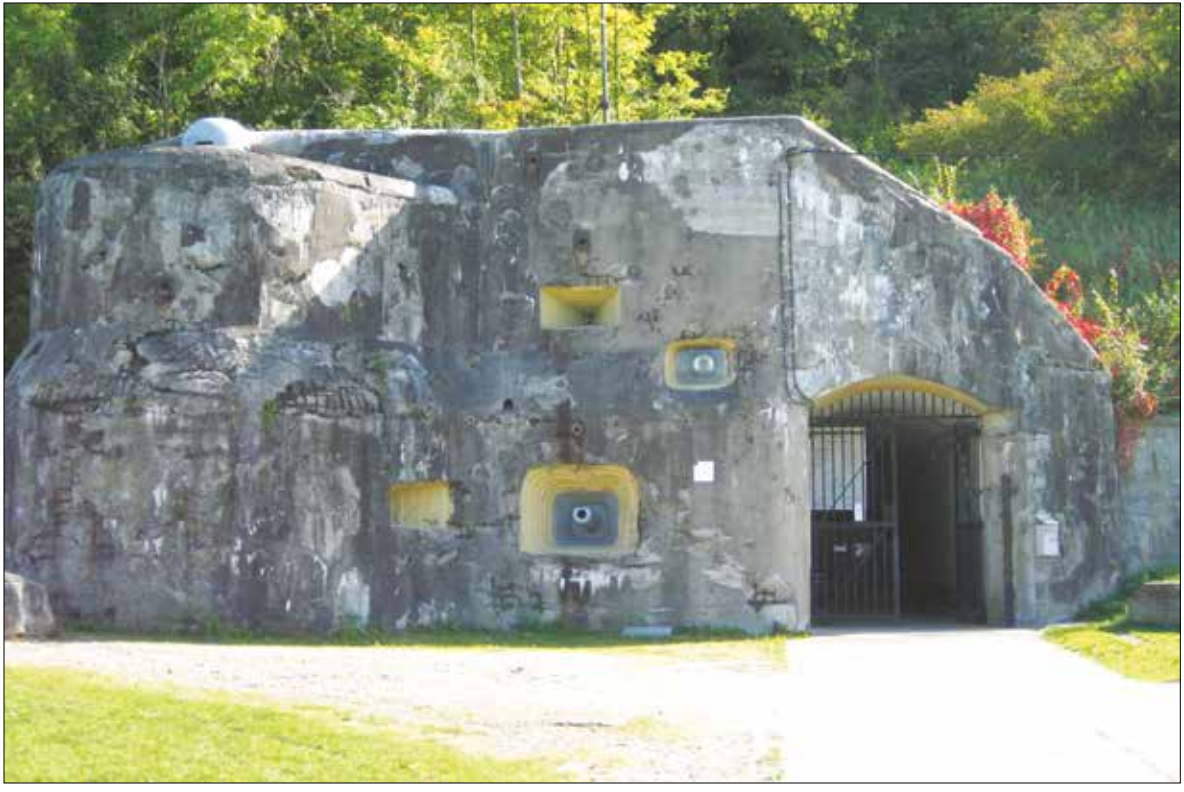


The cutting of the Albert Canal at Caestert, 2012.

B. Horn

A cupola overlooking the canal.

B. Horn



The entrance to Fort Eben Emael.

B. Horn

Corridor with protective equipment against gas attack.

B. Horn

Casemate 6.

B. Horn

Twin 120mm cupola.

B. Horn

Twin 120mm cupola.

B. Horn

Twin 120mm cupola.

B. Horn

Casemate housing three 75mm guns.

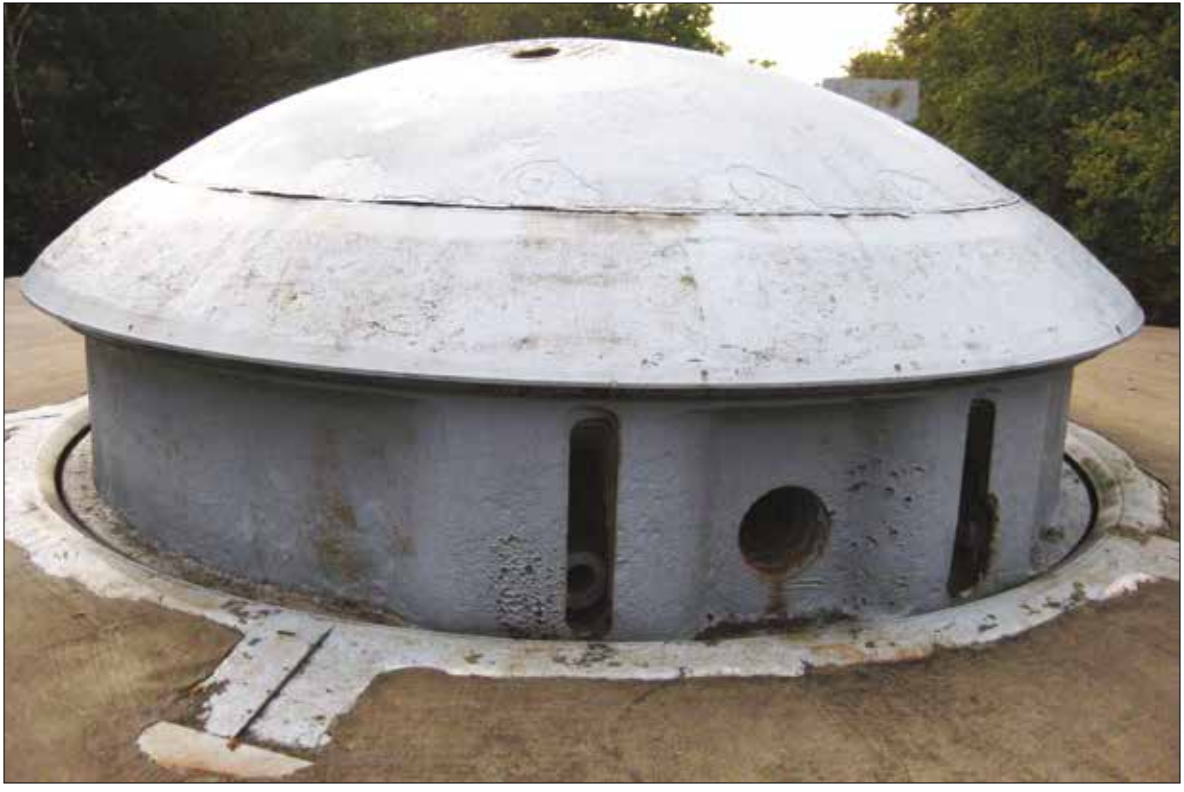
B. Horn

Casemate 4.

B. Horn

75mm Gun position inside a casemate.

B. Horn



Retractable, rotating cupola with 75mm guns.

B. Horn

The damage caused by a demolition charge thrown down the elevator shaft.

B. Horn

The resultant elevator shaft explosion blew open the steel doors, at the bottom, in the interior of the fort.

B. Horn

A reminder of the intensity of the assault.

B. Horn

Calmer days.

> sometimes had to be taken; or training and details of equipment, tactics, and objective had to be kept completely secret, and even among ourselves the name of the fortress was not generally known until after its capture. No leave was granted, nor were we allowed out, or to mix with men from other units. The sapper detachment was constantly moved around under different code names, and all parachute insignia and uniforms were left behind.[20]

All members of Storm Group Koch were required to sign statements that acknowledged that they risked a sentence of death should they "by intent or carelessness make known to others" anything about the base at which they were serving or the training they were undertaking.[21] Rank and insignia were removed and letters and phone calls were restricted, those that were absolutely necessary had to be cleared by Major Koch himself.

Training was carried out initially at Hildesheim, but the task force was moved often for security purposes. Rehearsals were essential. All of the sub-component Commanders viewed them key to success. Particularly for Witzig, practicing the glider insertion and actions on the objective were critical. On two separate occasions, despite the risk it entailed, they mounted full dress rehearsals utilizing the gliders. The Commanders deemed these dress rehearsals essential to confirm loads, aircraft handling, as well as ensuring that everyone knew what the landing would be like. Moreover, it was also important for everyone to overcome the fear of flying in a glider. The Commanders felt that the exposure to full dress rehearsals would provide confidence to all those involved in the mission.[22] "After the fullest use had been made of the training facilities in Hildesheim," Witzig revealed, "the detachment practised attacking strongly defended fortifications in the Sudetenland, and also carried out trial demolitions at Polish installations."[23]

Despite the lengthy detailed training and rehearsals, a large element of risk remained. Witzig explained:

> The failure of the whole mission could be brought about by heavy losses during take-off, flight landing and particularly during the critical period when the airborne force was within range of enemy infantry weapons. This critical period could, however, be reduced by means of nose-dive brakes, parachute-brakes, and landing spurs. Moreover, with its minimum gliding angle of 1:12 at a towing height of 2,000 metres, the freight glider could be released 20 kilometres from its objective and an experienced pilot could make a spot landing within a radius of 20 metres. This meant that we could approach noiselessly and, moreover, in the dark.[24]

The theory was soon to be tested. On 1 May 1940, Storm Detachment Granite moved to Ostheim airfield in Cologne. The gliders had been dismantled and moved to the airfield in large furniture vans to maintain secrecy. At the airfield, Luftwaffe technicians assembled the freight gliders in large hangers. Straw mats had been hung over the perimeter fence and 45 large generators discharged smoke creating a screen that cloaked the entire area from outside attention.[25] Then finally, the moment had arrived. Witzig described:

> After half a year of strict isolation, the alert in the afternoon of May 9 came as a relief. The Koch Storm Detachment met according to plan at the airfields of Koln-Ostheim and Koln-Butzweilerhof, some of them being brought in by the towing unit. At night the towing craft were brought to the runway, loaded, and the places occupied.[26]

Meanwhile, in Belgium, the 1,200 troops that were on strength at Fort Eben Emael were recalled from leave at 2235 hours, that same night, in anticipation of a German attack.[27] At 0030 hours, the Commander of Eben Emael, Major Jean F. L. Jottrand, received word of German movements on the Dutch border. Higher headquarters in Liege ordered an alert, the third one in the last month. Jottrand arrived in the Fort ten minutes later, as gun crews and others in the garrison began to trickle in. One delay in the alert notification was the absence of the gun crew for Cupola 31, however. They were responsible for firing twenty blank rounds, 30 seconds apart, to wake up and notify garrison members living in the community nearby, as well as those defending the bridges, that an alert was underway and to immediately man their defensive positions. Yet the alert signal was only sent at approximately 0330 hours, when Casemate 23 fired the necessary rounds in their stead. The problem was that the gun crews were busy moving out bedding and supplies from the barracks located just outside the Fort to the interior of the fortification as called for by the alert plan, as prior to imminent attack, the barracks were to be demolished so they would not interfere with the fields of fire of the guns. Although Major Jottrand was concerned with the delay in firing the warning signal, he was not overly anxious since he assessed the Germans had to first cross the Dutch frontier, which would give him a bit of warning, as well as time.

Back in Germany, at 0300 hours, the first of the towing aircraft began to trundle down the airstrip with their slaved gliders rumbling behind. The assault was underway. The entire aerial armada was in the air by 0335. “In complete darkness,” Witzig recalled, “the aircraft took off from the two tiny airfields and started their journey through the night. Height was gained by circling to the south, then we turned westwards following a route which had earlier been marked with beacons.”[28]

At 0340 hours the *Luftwaffe* began to bomb targets in depth, confirming the Belgian suspicions that an attack was imminent. Shortly before 0400 hours, a Belgian outpost reported to Jottrand that 30-50 aircraft flying at high altitude were sighted coming from the direction of Maastricht. Minutes later, at 0404 hours, Jottrand ordered the bridges across the Albert Canal to be blown.[29] But he was too late. The assault had begun.

The gliders of Storm Group Koch began to land shortly after 0410 hours, much earlier than planned due to a strong tail wind. They had achieved complete surprise. Tragically for the Belgians, the three bridges were not yet blown and the German *Fallschirmjägers* who had landed behind them quickly swept through the relatively undefended rear of the Belgian defences and captured the bridges.[30] Many of the defenders had not even realized the threat. They had believed the aircraft to be disabled light reconnaissance aircraft. Some thought them to be English as they could not see the German Swastika insignia. Only at Canne were the Belgians able to blow the bridge in time.[31]

Bundesarchive, Bild 146-1971-011-31/Kliem

The demolished bridge at Canne.

Bundesarchive, Bild 146-1971-011-55/Hanns Karl Rumpf

The demolished bridge at Canne.

Storm Detachment Granite achieved similar surprise and success. "Speed was essential," Witzig believed, "since anything not accomplished in the first 60 minutes would be made practically impossible later by the increasing strength of enemy defence."[32]

Moreover, the assault force was already understrength. Only nine gliders with 70 men actually landed on the top of the Fort, and they were without their commander. The flight was anticipated to last 50 minutes, during which time the aircraft were required to climb to approximately 2,600m in only 72km. Beacons and bonfires positioned by Luftwaffe personnel marked the route to the unhitching point just north-west of Aachen, Germany on the border. Suddenly, misfortune struck. The pilot of the Ju-82 transport plane towing Witzig's glider noticed an aircraft drifting perilously close. He instinctively dove to avoid a collision. The downward dive put tremendous stress on the tow line and even though the glider pilot reacted instantly and attempted to follow the tow plane in the dive, the pressure on the rope was too great and it broke setting the glider free. Luckily, the glider pilot was able to stabilize

the flight and land in a farmer's field close to Cologne. Witzig then commandeered a vehicle and drove off into the night searching for another tow plane while his detachment prepared the field and glider for a second, albeit improvised, take-off.

Witzig's aircraft was not the only glider to have a mishap. Shortly after Witzig's calamity, the Ju-82 towing Sergeant Max Maier and his Second Squad, waggled its wings indicating that the glider was to unhitch. The glider pilot realizing the error, specifically because they were still too low and too distant from the objective, refused to unhitch. As a result, the transport aircraft went into a steep left bank forcing the glider to release itself. Maier's glider now had the impossible task of trying to reach Eben Emael, 40km distant, with only approximately 1,500m of altitude.

Luck was seemingly against the aerial armada. At 0415 hours, when the aerial formation reached the unhitching point, indicated by a large searchlight at Vetschauer Mountain, near Aachen, the Aerial Commander did not give the signal to unhitch. A strong tailwind had caused them to arrive ten minutes early, but more importantly they were still 460m too low from the required altitude of 2,600m. As a result, the Aerial Commander decided to continue towing for another ten minutes until they reached the necessary altitude. However, this change of plans meant that the large aerial formation and its loud drone of engines could possibly alert the Dutch and Belgian defenders that an air onslaught was imminent. Nonetheless, they pressed on and once the armada had reached altitude, the gliders were released and each was now responsible to make its own way to the objective.

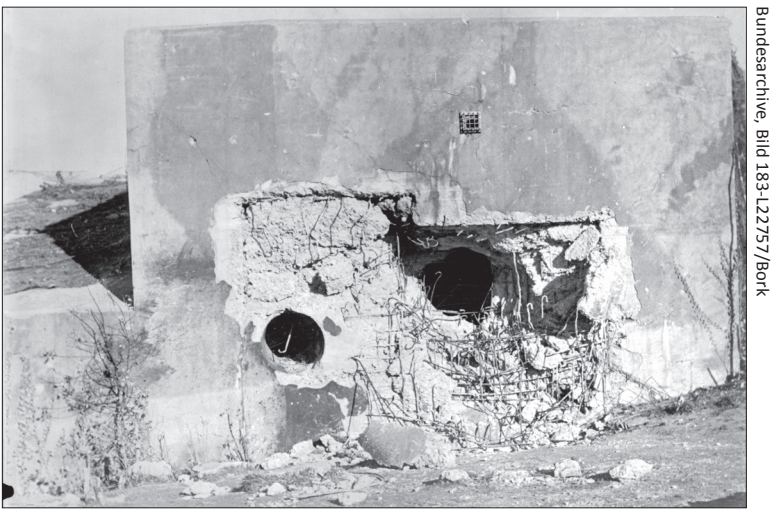
And so, shortly after 0400 hours, at Eben Emael, as Major Jottrand was trying to process all the information with which he was being inundated, another report arrived announcing that there were unidentified aircraft overhead and also noted that their engines

had stopped – they were seemingly motionless in the sky. By the time the defenders gathered their wits and began to fire their anti-aircraft guns, it was almost too late. The anti-aircraft machine guns were sighted and mounted for high-angle fire at high altitude targets. By the time the order to fire was given, many of the swooping, criss-crossing aircraft were too low to engage and then suddenly they were on the ground amongst the defenders.

By 0425 hours the ground assault had begun. Sergeant Hans Niedermeier and his One Squad were not one of the lucky gliders to avoid anti-aircraft fire. They dove through a virtually shredder as 60mm anti-aircraft fire tore through their glider. As the wreckage came to rest on the ground, Niedermeier raced to Casemate 18 and with assistance of squad members placed a 50kg shaped charge in the centre of the concrete bunker and ignited the fuse. The subsequent explosion blew the interior to pieces, killing those inside. Other members of the squad placed a smaller 12.5kg charge underneath one of the remaining 75mm guns and blew it off its mount. Neidermeier then led members of the squad into the casemate through the breach killing and capturing more Belgians. However, many escaped into the bowels of the Fort, where they quickly prepared the emergency barriers. Layers of steel beams and two steel doors with sand bags in-between were put in place to prevent the Germans from accessing the tunnel system below ground. Regardless, One Squad now controlled Casemate 18.

Two Squad, under command of Sergeant Max Maier, who were forced to release early, ended up landing in Duren, Germany, where they commandeered a truck and drove to Canne. In his desire to link-up with the remainder of the force at Eben Emael, Maier was killed attempting to cross the destroyed bridge. His second-in-command (2IC) eventually led the squad across and into the town of Eben Emael, but they were never able to gain entrance into the Fort. They did, however, capture 121 Belgians in Canne.

Sergeant Peter Arendt and his Three Squad were responsible for destroying Casemate 12. They seemed to have had a guardian angel. Their glider descended unmolested and landed unscathed approximately 30m from their objective. They approached their casemate and began trying to affix their demolitions without any resistance from the Belgian crew, who did not even realize the Germans were there. Arendt had difficulty placing the 50kg charge, so he elected to use the 12.5kg demolition at the base of the gun mount instead. The resulting explosion was horrific, tearing the gun off its mount sending it careening through the chamber and down a stairway, killing and wounding Belgian soldiers inside, as well as igniting a fire and secondary explosions fuelled by propellent stacked inside. The chamber quickly filled with thick smoke and toxic fumes.



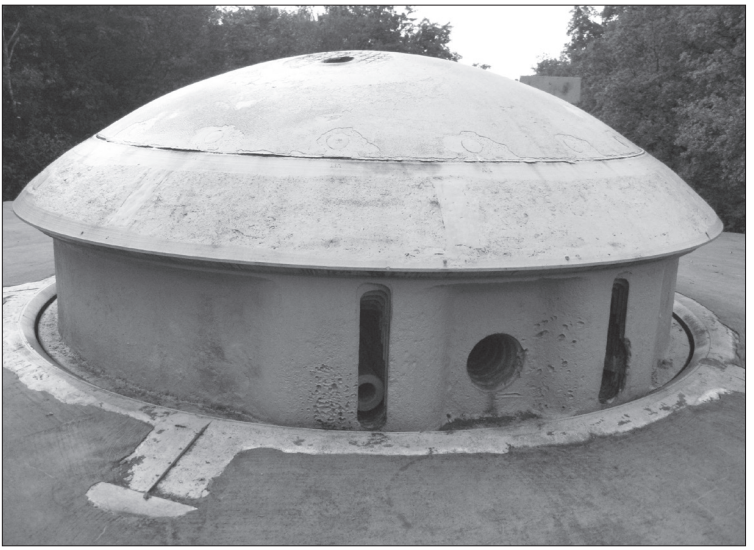
Bundesarchive, Bild 183-L22757/Bork

The effects of the *Hohlladung* (shaped charge) on a Eben Emael gun emplacement.

Three Squad fired their small arms through the opening and entered into the chamber. Three wounded Belgians were pulled outside, away from the toxic fumes. Arendt then worked his way into the interior of the Fort. Hearing voices he dropped a 3kg

charge down an elevator shaft killing more Belgians. He worked his way down a staircase, at one point noting that three of the stair coverings had been removed. In the dark an unknowing pursuing intruder could easily fall through the metal staircase where the "steps" had been removed and meet his death or serious injury. At the bottom, Arendt came upon a steel door that barred further progress. As a result, he returned to the surface.

Photo by Author



Retractable cupola with 75mm guns.

Four Squad met with a similar welcome to One Squad. As soon as Sergeant Helmut Wenzel's glider hit the ground it was taken under machine gun fire from his objective, Casemate 19. The Belgians were firing from the steel dome on top of the casemate. Wenzel's men took the casemate under immediate assault and forced the Belgians to close the steel observation doors to the cupola. Wenzel dropped a 3kg charge down the observation periscope that protruded from the cupola. Despite the fact that it reverberated throughout the cupola, it seemed to have no effect. The Belgians continued to fight on. Wenzel next placed a 50kg charge

on top of the steel dome but it failed to fully penetrate. However, the impact of the explosion rendered the cupola inoperable, having dislodged the dome from its track so it could not revolve. The Belgian defenders subsequently withdrew into the interior of the Fort. Wenzel then moved down the hill to the base of the mammoth concrete casemate. He placed a 50kg charge at the gun embrasures blasting open a large hole through the concrete, killing and wounding those inside and destroying the guns. The Belgians soon abandoned the completely destroyed Casemate 19.

The glider pilot for Five Squad set their DF-230 glider right down on top of a Belgian machine gun position. After neutralizing the position, Sergeant Erwin Haug and his men immediately assaulted Cupola 23. The demolition dislodged the gun mounts but did not prevent the gun from firing altogether. Nonetheless, Haug and his squad went to assault Casemate 30, although it was not part of their assignment. Once again, their demolition failed to fully neutralize the guns within. Throughout their actions, both themselves and Six Squad were taking effective fire from the storage shed located near Cupola 24. As a result, they conducted an attack but were repulsed with casualties. At the same time, Belgian artillery, called in by Major Jottrand on his own position, began to rain down on the attackers. Haug and the remaining members of Five Squad sought shelter in a ditch, where they were forced to remain until nightfall.

At the northern end of the Fort, Six Squad under Sergeant Siegfried Harlo, ran through a gauntlet of fire which raked their glider on approach and then landed in a sea of barb wire that brought the glider to an abrupt stop. The wire was so thick that it blocked the exits of the glider. As a result they had trouble extricating themselves from the mangled glider and wire obstacle. When they finally arrived at their objective, Cupola 14, they discovered another squad

had already destroyed it. Moreover, it was actually a dummy position with a fake cupola. Nonetheless, where the cupola had been there was an unoccupied machine gun emplacement dug into the ground. Harlo set a 50kg charge into the emplacement and pulled the igniter. The subsequent explosion blasted a hole into the inner bowels of the Fort causing concrete and earth to cave-in to the tunnels below. Harlo then established a machine-gun position to anchor the north end of the position and from which he engaged Belgian forces throughout the attempted counter-attacks.

Also at the extreme north end of the Fort, Seven Squad, under Sergeant Heineman, was responsible for destroying Cupola 16. They quickly assaulted the position and affixed their demolitions. They realized it too was a dummy position.

For Eight squad the approach was nerve-racking. In an effort to avoid sheets of anti-aircraft fire, the glider pilot expertly dipped the aircraft below the east cliff wall adjacent to the canal and then at the last moment pulled up and landed the DF-230 approximately 30 m from the imposing Casemate 31. Sergeant Otto Unger and his squad disembarked and came under immediate withering fire from the storage shed and their objective. Unger split his squad. Some, assisted by Five Squad, attacked the storage shed, while he and two other men assaulted Casemate 31.

The Belgian gun crew in Casemate 31 had been warned off 30 minutes prior to Unger's landing. Amazingly, however, the guns were not ready for action. Firstly, the door to the ammunition locker was locked and no one could find the keys. Secondly, once this hurdle was passed, the elevator that carried the rounds to the gun room malfunctioned. As such, only a limited number of the heavy 75mm rounds could be carried up to the guns. Ironically, just as the crew loaded the first round into the breach, Unger's 50kg charge detonated, killing two and wounding many others.

Next, Sergeant Unger placed another 50kg charge on the steel dome on top of the casemate. From his perspective outside the fort, it appeared to have had no effect. In actuality, the impact of the explosion completely destroyed the inside of the chamber, destroying the guns and rendering them totally unusable. Unger also set a 12.5kg charge at an exit door, which blew the door off its hinges and caused the concrete walls to collapse on themselves, completely blocking the exit and thus sealing the Belgians inside.

Eight Squad was then ordered to move to Wenzel's position in the North, however, heavy machine gun and artillery fire killed Unger and several others. In the end, only three members of the squad survived to join Sergeant Wenzel.

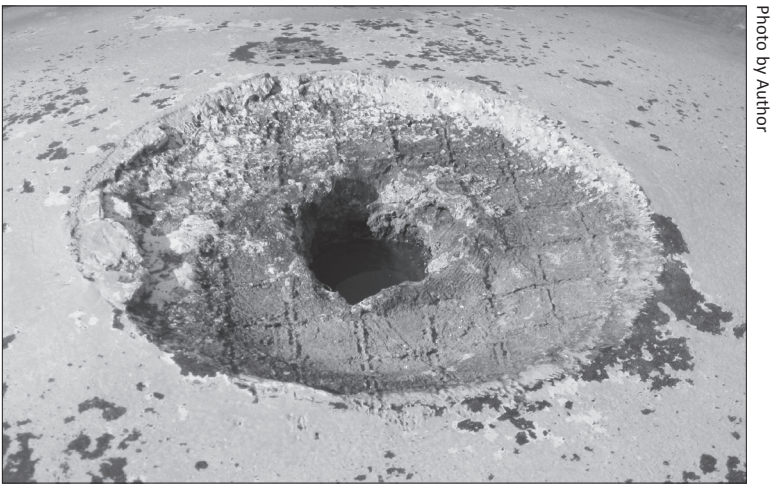


Photo by Author

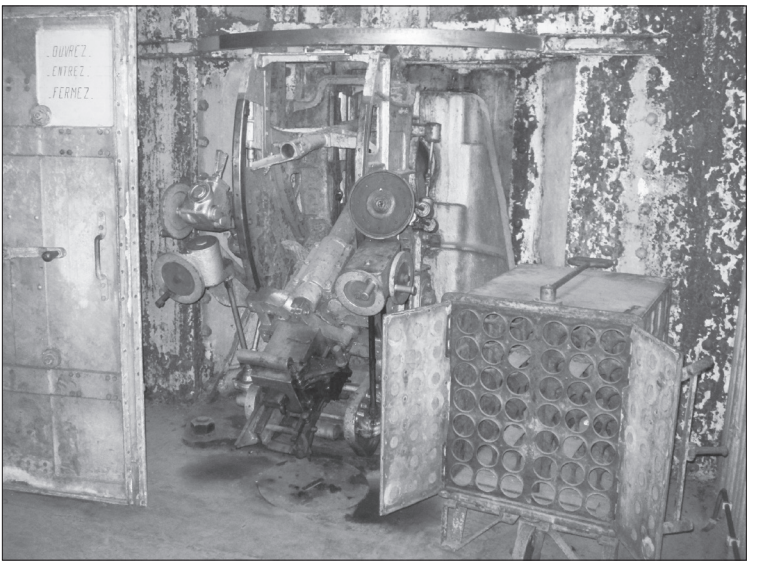
The external effect of a 50kg shaped charge.

Nine Squad was another who received a warm welcome, sustaining heavy damage from anti-aircraft fire on approach. Nonetheless, they were able to land 60m from their objective, Casemate 13. They too landed in a morass of barb wire, which impeded their exit from their glider. Fighting through the obstacle, Sergeant Ewald Neuhaus led his section against his objective. The heavy

Belgian machine gun fire made the approach difficult, however, a flamethrower quickly forced the Belgians to pull away from the embrasure. Witzig later described, "The only installations protected by barbed wire were in the north, where the sappers had to free themselves with wire cutters and turn their flame-thrower on a machine-gun firing from an embrasure, before they could place their charges."[33]

Neuhaus's men placed a 12.5 charge over the machine gun embrasure but the Belgians cleverly used a ramrod to knock it down onto the ground where it exploded without effect. The Germans then dropped a number of grenades through the gun embrasure opening, silencing any resistance. Next Neuhaus placed a 50kg charge on the steel doors leading into the casemate. The resultant explosion was horrific, blowing in the door and supporting wall. Neuhaus entered the inner chamber and found the Belgians disorientated and in shock on the ground. He proceeded to set up a defensive position.

Photo by Author



The interior of a 75mm gun station.

Sergeant Heubel and his Ten Squad were originally designated as the Detachment reserve. Their glider took heavy fire on approach but fortuitously no-one was injured. The squad took cover and awaited orders. The runner contacted Sergeant Wenzel, who had taken command once he realized First-Lieutenant Witzig had not arrived. He now passed on orders for Willi Heubel to take out Case-mate 26, which had been Two Squad's original objective. Heubel and another squad member quickly assaulted the objective and placed a 12.5kg charge on the observation dome. The resultant explosion put the position out of commission for the remainder of the fight.

Photo by Author

120mm gun cupola with 50kg shaped charge crater.

Cupola 24 nearby, however, with its twin 120mm guns, still remained menacingly dangerous. Luckily for the Germans, the Belgians experienced difficulties. Once again, key equipment was missing or non-functioning. Many suspected treachery.[34] None-theless, before the guns could be effectively brought into action glider pilot Heiner Lange, although seriously wounded, retrieved

a 50kg charge from his wrecked glider and single-handedly placed the charge on the top of the cupola and pulled the fuse. The resultant explosion failed to destroy the guns, however. Thankfully, Sergeant Wenzel arrived shortly after and dropped two charges down the gun barrels finally putting the position out of commission.

The main objective of Storm Detachment Granite's initial assault was to destroy the guns that could fire on the bridges. They accomplished this action in the first 15 minutes of the attack. Now all that remained was to ensure the Belgians did not mount an effective counter-attack. Sergeant Wenzel and his battered assault detachment now had to hold the position until 4th Panzer Division arrived. The surviving members of Storm Detachment Granite proceeded to place signal panels on top of the captured / destroyed cupolas and casemates to indicate they were in German hands. The Stukas, as part of planned air support for the operation, then focused their attention on pockets of Belgian resistance. Within the hour, Wenzel also received an air drop of ammunition.

At 0630 hours, two hours after the assault had begun, Storm Detachment Granite received a surprise. Suddenly, a tenth glider swooped down and landed near Casemate 19. First-Lieutenant Witzig had finally arrived. Despite a delay, he had been successful in finding another tow plane and getting airborne once again.

Although the plan called for the assault force to hold the Fort for only four hours until link-up, the theory was not in concert with the reality of the situation. By noon there was no sign of a relief force. Witzig explained:

> The Belgians had blown up the Canne bridge in time. Here our paratroopers were engaged in a whole day of hard fighting, which prevented the 51st Sapper Battalion, detailed to relieve us, from crossing the canal. Their

> attempts to cross in rubber dinghies were made extremely difficult by the shooting from Emplacement 15 [actually Casemate 17], by the side of the canal – we could ourselves hear the gunfire far below us. Eventually, we managed to bring this emplacement under partial control by using hanging charges to block the look-out slits in the observation dome with smoke and dirt.[35]

Moreover, the Belgians locked up inside Eben Emael were calling artillery from a neighbouring fort to fire on Storm Detachment Granite in an attempt to sweep the Germans off the surface. All it accomplished, however, was to drive the assault force to take shelter in the casemates they had just captured. Throughout the day the Germans held out engaging small groups of Belgians that emerged on the surface or in the surrounding area for a counter-attack.[36] Sergeant Arendt and his squad actually assaulted into the bowels of the Fort itself. In the process they destroyed access points that allowed passage to the exterior. Additionally, the Stukas disrupted a number of attempts at counter-attacking by Belgian forces stationed outside the Fort.

The stalemate persisted for most of the day. By early evening Witzig consolidated his forces in the north end in anticipation of a concerted counter-attack. Witzig explained, “The Belgian artillery started to shell our positions and their infantry attacked us repeatedly over the north-western slope, which was covered with dense undergrowth.” He elaborated, “The situation forced us to defend ourselves in the north-western area, so that we only managed to remain in occupation of this part.”[37]

At the same time, Witzig also realized that Casemate 17, which had not been destroyed since it could not fire on the bridges, could in fact interfere with troops crossing the canal. As such, he ordered its destruction. However, they were unsuccessful. They attempted

to blow the position three times, even lowering charges on a rope, but to no avail. The guns continued to fire throughout.

Photo by Author

Canal defensive casemate that German attackers were unable to disable.

The Belgian defenders inside the Fort were clearly rattled. The Fort itself was in tatters. The power was cut off in many sectors, there was minimal lighting, no air ventilation, heat or air conditioning and smoke lingered in most of the interior. In addition, the Belgians were unsure as to how many Germans were on the surface. Nonetheless, at 2000 hours, Major Jottrand's "Forlorn Hope" decided to personally lead a counter-attack. He assembled 60 men and planned to surprise the Germans by exiting through an emergency exit. However, the Germans had already found the exit point and once again, fate intervened against the Belgians. Just as Jottrand was approaching the exit, the Germans detonated a charge that blew a massive hole in the Fort wall. Fearing he had lost surprise, Jottrand withdrew into the interior once again and decided to fortify his position. He now decided that preventing

the Germans from taking control of the subterranean component of Eben Emael was all that he and his forces were capable of.

To make matters worse for the Belgians, throughout the night Witzig and his men continued to assault Belgian positions that were still firing. By morning the Fort was virtually rendered out of action. First-Lieutenant Witzig recalled:

> [At] about 0700 hours on May 11 the advance section of the 51st Sapper Battalion at last arrived at the fortification, having crossed the ditch in front of Installation 14 in a rubber dinghy. They silenced Emplacement 14. This opened the way for the whole battalion to cross. Towards noon, more groups came up over the western edge, and the last Belgian installations ceased firing.[38]

At 0830 hours, 11 May 1940, Storm Detachment Granite was formally relieved by elements of the 151st Infantry Regiment. Witzig and his survivors departed Eben Emael at approximately 0930 hours. At 1227 hours, Major Jottrand officially surrendered the fortress. The Eben Emael garrison had lost 25 killed and 63 wounded. The Germans destroyed 10 of 17 cupolas and casemates. They had lost 23 dead and 59 wounded.[39] Storm Detachment Granite suffered 6 killed and, apart from injuries sustained by the hard landings, 15 wounded.[40]

AFTERMATH

The *coup de main* on Eben Emael was a stunning victory that proved key in the rapid penetration of Belgium, which was instrumental in drawing the Allied forces into the trap in Northern Belgium and Holland. It was achieved by innovation and daring by a relatively small force. After the war, General Student told renown strategist Basil Liddell Hart:

> After meeting the paramount needs of the coup in Holland, only 500 airborne troops were left to help the invasion of Belgium. They were used to capture the two bridges over the Albert Canal and the Fort of Eben Emael, Belgium's most modern fort, which flanked this waterline-frontier. That tiny detachment, however, made all the difference to the issue. To compensate for the scantiness of the actual resources, and create as much confusion as possible, dummy parachutists were scattered widely over the country.[41]

Overall, the German invasion caught the Allies unprepared. Manstein's plan worked perfectly. General Gort's observations captured the confusion and impending doom. He reported:

> At Maastricht, it was reported that they [Belgians] had been forestalled by enemy action from the rear and had been unable to demolish important bridges over the Albert Canal and the Meuse across which the enemy had begun to move. Air bombing was requested and was extremely effective, but could not altogether deny the passage of the water obstacles to the enemy...The enemy progress across the Albert Canal had up to now been relatively small, due to a successful counter-attack by the French Cavalry Corps at St. Trond, but larger concentrations were now reported north of the Albert Canal. Disquieting news was received from the Ardennes, where a German thrust was reported as developing on the front of the French 9th Army, with at least two armoured divisions…The speed with which the enemy exploited his penetration of the French front, his willingness to accept risks to further his aim, and his exploitation of every success to the uttermost limits emphasised, even more fully than in the campaigns of the past, the advantage

> which accrues to the commander who knows how best to use time to make time his servant and not his master… Again, the pace of operations has been so accelerated by the partnership between offensive aircraft and modern mechanised forces that the reserves available for the defence are of little use unless they are fully mobile or already in occupation of some reserve position…So ended a campaign of 22 days which has proved that the offensive has once more gained ascendency in modern war when undertaken with an army equipped with greatly superior material power in the shape of air forces and armoured fighting vehicles.[42]

In the end, the destruction of the West took 46 days, but it was decided in only 10.[43] As such, on the night of 2 June 1940, the last of the British soldiers were evacuated from the beaches of Dunkirk, France. However, the desperate withdrawal resulted in the loss of virtually all their heavy equipment, weapons, and vehicles.[44] Key to this outcome was the capture of Eben Emael. Field Marshal Albert Kesselring asserted the operation "had been a military masterpiece." He added, "The success of the operation with respect to its strategic effect is incontestable. The Dutch theatre of operations was practically eliminated."[45]

CONCLUDING REMARKS

With regards to their remarkable success, First-Lieutenant Rudolf Witzig assessed:

> The real reasons for the capitulation of Eben-Emael seem to be as follows: although an attack was clearly not expected, our use of tactical and technical surprise made the destruction of the vital surface installations, artillery and observation posts possible, and this in turn made the enemy uncertain about the general situation. Damage to

> the ascent shafts and ventilating system only increased their confusion; all help from outside, including the field artillery, failed. They felt captives in their own fortress and their fighting spirit was stifled. Although defeated only in their surface positions, they were not prepared to make a counterattack in the open field, even before the fortress was surrounded; while they may have been trained only to fight under armed cover, this nevertheless reveals shortcomings. Certainly, an attack by night would have hurt us considerably.[46]

Witzig's explanation fails to pay full measure to the daring and innovation of the plan and achievement, however. With only 438 personnel for the entire endeavour of capturing the bridge crossings and the Fort, and with only 85 *Fallschirmjägers* allocated to the capture of Fort Eben Emael itself, and remarkably only 70 actually taking part in the initial assault, the operational effect was immense.

The success, however, was not due to a throw of the dice. It was the result of meticulous thought, planning and training. First, an imaginative solution was required to overcome a complex problem. The ability to recognize, accept and implement new technologies, methodologies and tactics is a major accomplishment. Too often an embedded conservative organizational culture, adherence to the *status quo*, an intolerance towards change and an over reliance on experience blinds organizations to opportunity. In fact, success here is as much a function of German innovation and daring as it is Allied inability to develop philosophically, theoretically and practically from their defensive war mindset. The signs were all there. Both the Soviets and the Germans had undertaken serious developments in their airborne and mechanized approach to warfare, substantially in theory, but also in practice, throughout the 1930s.

The success of the operation also depended on the innovation to develop new tactics based on an untried assault vehicle, the DF-230 glider, a new method of attack (i.e. glider and parachutists), combined with new technology (i.e. the *Hohlladung*). This innovation required foresight and risk acceptance. It also demanded a realistic appraisal of limitations and effect, namely that although surprise, speed and violence of action would create physical dislocation in the enemy, it would be relatively short-lived. As such, actions on the objective would need to be swift and precise.

The essential requirement for surprise to allow the freedom of manoeuvre to accomplish the task in the moments following landing drove three other key factors for success, specifically security, training and rehearsals. Storm Group Koch took great pains to ensure security of both the mission, as well as the technology / methodology being employed. The task force was virtually isolated for approximately six months prior to D-Day. Frequent moves, cover names, and restriction on correspondence and individual freedom of movement were all imposed to guarantee secrecy, as was the threat of death in the event someone compromised the mission. The understanding by all was that success by a small force, severely outnumbered, working deep behind enemy lines could only be attained if the enemy were completely unaware of what was about to set upon them so they could not take steps to mitigate the attack.

Equally important was training. With a reliance on surprise, speed and violence, came the necessity that each individual was able to function without hesitation. All, regardless of rank, were required to be proficient in the use of weapons, explosives and all other detachment equipment. All were required to understand the intent of the plan, their mission, as well as the tasks of others so that in the event of catastrophe any and all could carry on to achieve the larger intent. This ability is why the absence of the Commander

of Storm Detachment Granite at the start of the assault, or the failure of Two Squad to appear, had little impact on the outcome. Others were ready and able to fill the gaps.

But training in and of itself was not enough. Becoming proficient with weapons and equipment in isolation does not necessarily ensure success. The training must also be realistic and set in the context of the mission to be conducted. As such, continual rehearsals utilizing all component parts set in as near to realistic settings as possible is essential. Repetition and rehearsals build competence and confidence. It also allows for an ability to identify flaws in the plan, as well as to work through possible contingency plans. The expertise and confidence built in the process, in turn feeds the ability to maximize speed on the objective as everyone has seen and done the task over and over by the time they arrive on the objective.

And so, the assault on Fort Eben Emael was a classic example of what can be achieved through daring and innovation. Specifically, it speaks to the ability of a small force, expertly trained, executing a well thought-out and rehearsed plan, being able to achieve operational effect, and potentially strategic effect, through surprise, speed and violence of action.

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NOTES

1 Maj. Gen. F.W. Von Mellenthin, *Panzer Battles* (New York: Ballantine Books, 1956), 14.

2 Mellenthin, 14. Army Group A was commanded by Colonel General von Runstedt; Army Group B by Colonel General von Bock; and Army Group C by Colonel General von Leeb.

3 Specifically, on 10 January 1940 engine failure forced a German ME 108 aircraft carrying a *Luftwaffe* officer who had in his possession a detailed plan of the pending invasion of Belgium and the Netherlands to land in a deserted field just inside Mass-Mechelen, Belgium. The Allies rightfully concluded that the documents were genuine. This find reinforced their belief that the anticipated German offensive would cut through northern Belgium.

4 Heinz Guderian, *Panzer Leader* (London: Arrow Books, 1990 ed), 91. Guderian noted that a war game conducted on 7 February 1940 in Koblenz demonstrated the plan to be potentially highly successful.

5 Field Marshal Erich von Manstein, *Lost Victories* (Novato, CA: Presidio, 1982), 94 & 104. Manstein revealed, "I found it humiliating, to say the least, that our generation could do nothing better than repeat an old recipe ...What could possibly be achieved by turning up a war plan that our opponents had already rehearsed with us once before and against whose repetition they were bound to have taken full precautions?" Ibid., 98. The well-known strategist B.H. Liddell Hart, after his interviews with senior captured German generals, recounted, "So [Field Marshal von] Manstein conceived the bold idea of shifting the main stroke to the Ardennes. He argued that the enemy would never expect a mass of tanks to be used in such difficult country. Yet it should be practicable for the German tank forces, since opposition was likely to be slight during the crucial stage of the advance. Once they had emerged from the Ardennes, and crossed the Meuse, the rolling plains of Northern France would provide ideal country for tank manoeuvre

and for a rapid sweep to the sea." B.H. Liddell Hart, *The German Generals Talk. Startling Revelations from Hitler's High Command* (New York: Quill, 1979), 113-114.

6 The German High Command assigned Army Group A 45 divisions, 7 of which were panzer divisions to cut through the Ardennes Forest. Army Group B received 30 divisions, 3 of which were armoured and Army Group C had 19 divisions.

7 Mellenthin, 16, 28. Von Mellenthin argued, "The Battle of France was won by the German Wehrmacht because it reintroduced in warfare the decisive factor of mobility. It achieved mobility by the combination of firepower, concentration, and surprise, together with expert handling of the latest modern arms – Luftwaffe, parachutists and armor." Ibid., 30.

8 Karl-Heinz Frieser with John T. Greenwood, *The Blitzkrieg Legend. The 1940 Campaign in the West* (Annapolis, Maryland: Naval Institute Press, 2005), 38, 56.

9 General the Viscount Gort, "First Despatch" (Covering the period 3rd September, 1939 to 31st January, 1940), 25 April 1940, *Supplement to The London Gazette*, March 1941, 40. PRO, CAB 66/17, Memoranda, W.P. (41) 128 -W.P. (41) 177, Vol XVII.

10 Belgium had a small number of tanks which were deployed on the Dyle Line.

11 Lieutenant-Colonel I. H. Lyal Grant, "The German Airborne Attack on Belgium," In May 1940, *RUSI*, Vol 103, February 1958, No. 609, 96.

12 Captain Boyd T. Bashore, "Sword of Silk," *Infantry School Quarterly*, October 1956, 59. 6th Army consisted of 20 divisions.

13 Grant, 97.

14 Oberst Rudolf Witzig, "Coup from the air: the capture of Fort Eben-Emael," *History of the Second World War*, Part 4, 107.

15 Grant, 97. The theory behind the hollow charge was articulated already in 1888 by Charles Munroe, an internationally renowned explosives expert. In essence, the hollow charge (shaped charge) permits a "normal" explosion to create a jet of high pressure immediately upon detonation, which in turn generates tremendous penetrating power even when using a relatively small charge. With the shaped charges used on Eben Emael, once ignited, the explosion from a charge melted its steel liner and sent a molten stream of metal, as well as metal splinters and hot gases, through a narrow hole in the cupola or casemate killing everyone inside. The large 50kg charge was divided into two pieces and had to be assembled prior to employment. The Germans also used a one-piece 12.5kg charge that could penetrate up to 15cm.

16 In total, four tug squadrons (44 x Ju52s), four glider squadrons (44 gliders) and one transport squadron (i.e. to drop parachutists, dummies and supplies) were allocated to the effort. Grant, 99.

17 William H. McRaven, *Spec Ops. Case Studies in Special Operations Warfare: Theory and Practice* (New York: Presidio, 1995), 43.

18 Witzig, 109.

19 Ibid., 109. Approximately 5 tons of explosives were carried.

20 Ibid.

21 James E. Mrazek, *The Fall of Eben Emael* (Novato, CA: Presideio Press, 1991), 49. This book remains the seminal source on the actual event.

22 McRaven, 42. It was also determined that the landing surface on the top of Fort Eban Emael was too small for landing the gliders due to their speed and distance they would travel on the ground until they came to a stop. As a result, a hand brake was designed to assist the large gliders in stopping sooner.

23 Witzig, 109.

24 Ibid., 107.

25 All the gliders were wedged into the hangars. The technicians were not allowed to leave the confines of the airfield until after the assault was complete.

26 Witzig, 109. Koch held his final Orders Group at 2100 hours, 9 May 1940.

27 Witzig later recounted, "According to a Belgian source, at the beginning of the attack there had been about 750 men present out of a regular force of 1,200." Witzig, 110.

28 Ibid., 109.

29 Captain Boyd T. Bashore, "Sword of Silk," *Infantry School Quarterly*, October 1956, 61.

30 At the Vroenhoven bridge, the defenders reported to headquarters that a plane had landed nearby and they queried whether or not they should shoot. The reply from an unidentified voice over the telephone network was "yes." Mrazek, 82-83.

31 It was a close run thing. The sergeant at the bridge refused to carry out the order because he wanted to wait for his platoon officer to arrive to avoid the personal responsibility of blowing the bridge. Only when Major Jottrand telephoned the bunker and forcefully ordered the sergeant to carry out the order did the demolition take place, mere minutes before the German assault force arrived.

32 Witzig, 109.

33 Ibid.

34 See Mrazek, 105-106.

35 Witzig, 101.

36 The Belgians did attempt several counter-attacks, however, as artillerymen, they lacked the weaponry, training and tactics to competently challenge the German assault force.

37 Witzig, 110.

38 Ibid.

39 McRaven, 55.

40 Witzig, 111.

41 Hart, 119.

42 Gort, "First Despatch."

43 The German victory was somewhat deceptive. Its success owed as much to Germany's innovative doctrine and tactics as it did to the Allie's unpreparedness. Quite simply, the modern German mechanized spearhead was largely a facade. Nearly 80 per cent of the German Army for both the French and Russian campaigns remained a foot and horse-drawn army. See Williamson Murray and Allan R. Millett, eds., *Military Innovation in the Interwar Period* (New York: Cambridge University Press, 1996); John A. English, *On Infantry* (Westport: Praeger, 1984), 47-85; Len Deighton, *Blood, Tears, and Folly* (London: Pimlico, 1995), 160-204; and Len Deighton, *Blitzkrieg* (Edison, NJ: Castle Books, 2000).

44 53,000 French troops were evacuated 3-4 June 1940, after the withdrawal of the British forces was complete on 2 June. The British Admiralty estimated that approximately 338,226 men were evacuated between 26 May and 3 June. The British left behind 2,000 guns, 60,000 trucks, 76,000 tons of ammunition and 600,000 tons of fuel and supplies. Cesare Salmaggi and Alfredo Pallavisini, *2194 Days of War* (New York: Gallery Books, 1988), 4 June 1940; and I.C.R. Dear, ed., *The Oxford Companion to World War II* (Oxford: Oxford University Press, 1995), 312-313. Another account gives the losses as 475 tanks, 38,000 vehicles, 12,000 motorcycles, 8,000 telephones, 1,855 wireless sets, 7,000 tonnes of ammunition, 90,000 rifles, 1,000 heavy guns, 2,000 tractors, 8,000 Bren guns and 400 antitank guns. On 6 June the War Cabinet was informed that there were fewer than 600,000 rifles and only 12,000 Bren guns in the whole of the UK. John Parker, *Commandos. The Inside Story of Britain's Most Elite Fighting Force* (London: Headline

Book Publishing, 2000), 15. Yet another source gives the losses as: stores and equipment for 500,000 men, about 100 tanks, 2,000 other vehicles, 600 guns, and large stocks of ammunition. A.J. Barker, *Dunkirk: The Great Escape* (London: J.M. Dent & Sons Ltd., 1977), 224. Notably, a major problem with determining numbers is the actual categorization of equipment.

45 Bashore, 62. Kesselring was referring to the entirety of the airborne operations to capture Rotterdam, the Hague, as well as Eben Emael and the bridges across the Albert Canal.

46 Witzig, 111.

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