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**ZNACZENIE WSPARCIA LOGISTYCZNEGO DLA ARMII NA PRZYKŁADZIE
OPERACJI WOJSKOWEJ "OVERLORD"**

**MEANING OF LOGISTICAL SUPPORT FOR ARMY ON THE EXAMPLE OF THE
"OVERLORD" MILITARY OPERATION**

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Abstract

Logistics traces its roots back to ancient times and grew on the grounds of the art of war. Over the years, the definition of logistics has undergone changes. Many specialists in this field have created their own definitions of logistics and military logistics, but they all focused on providing supplies for the military and organizing transportation and socio-living conditions for them. The functional system of logistics consists of six subsystems: material, technical, management, transportation and troop movement, military infrastructure, and medical. Despite such a complex military logistics system, it plays an important role in military operations. An example of this is the largest amphibious assault in history - "Overlord," the Allied landing in Normandy. This operation contributed to the shortening of World War II and the Allied victory over the Third Reich. Conducting such a large-scale military operation would not have been possible without a specialized logistics and military staff. Logistic actions enabled the conduct of military operations. These two aspects were closely intertwined. For example, to be able to load goods for the military in ports, they first had to be captured and secured. A diversified transport system allowed the Allies to provide military supplies depending on the conditions. It is undeniable that without logistical support, the "Overlord" operation could have ended in failure. The information used to create this work comes from books and articles by historians and specialists in the field of military logistics. The article aims to present the essence of military logistics, explain the concept of logistics support, and demonstrate it through a historical case study.

Keywords

Logistics military, "Overlord", Allies, Normandy, logistical support

Introduction

Logistics is the management of the flow of resources between economic entities in the supply chain. Its proper functioning affects the development of the entire organization, leading, for example, to cost optimization or an increase in the level of customer service. Logistics as a science has been known for a short time, but its practical dimension has existed since the invention of the wheel and the need to move people and goods. Therefore, wherever there are flows of resources, there is logistics. For example, in the army and during hostilities. One of the most important military operations was the landing of the Allies in Normandy, which contributed to the defeat of the Third Reich and the shortening of World War II. With such a large undertaking, logistics were the basis. Despite the passage of time, logistics plays a key role in the conduct of military operations. Military operations and their logistical support are inextricably linked. The success of military operations depends on logistics - and vice versa. The aim of the article is to confirm and develop the above thesis on the example of the "Overlord" operation carried out by the Allies in June 1944. The methodology of the work includes specialist literature in the field of military logistics (books and scientific articles). At the beginning, it was discussed what military logistics is, what is the logistics security to successfully carry out military campaigns. The second part is a historical outline of Operation Overlord and related logistical activities as historical evidence to support the position. The entire publication is summarized in the conclusion and contains the most important conclusions that result from the analysis of the historical case.

Definition and essence of military logistics

Logistics itself comes from different languages. From the Greek *logistikos*, *logos*, *logicos* means counting, the art of counting, correct thinking. The Latin *logisticus* is very similar in meaning - reasonable, rational. But it is the French word *logistique*, meaning accommodation, quarters, that is most closely related to the military area, although one should not forget that the Latin and Greek translations reflect the essence of logistics as a science and industry based on rational thinking and counting [Jałowiec 2020]. As mentioned above, logistics is the management of the flow of resources. The success of logistics projects, the success of enterprises on the market and war campaigns depend on the rational allocation of resources. In antiquity and the Middle Ages, no one bothered to define logistics and military logistics. More interesting was its practical dimension. Fast and efficient movement of troops, supplying the army with weapons, ammunition, food and fuel determine the success of military campaigns. This problem was already noticed by Sun Tzu - a Chinese philosopher

and specialist in the art of war, who in his work "The Art of War" drew attention to the issue of supplying the army [Tzu 2004] . King Philip II of Macedonia did not know Sun Tzu personally, but he also considered army supplies and logistics to be a key factor in the success of wars. His reforms in the Macedonian army included replacing oxen with horses and camels as beasts of burden that needed less fodder. In addition, a horse could carry a load of 450 kg over a distance of 50 km, and an ox the same load - over 16 km [Juniper 2020] . Thanks to these reforms, the son of Philip II - Alexander the Great - unified Greece, conquered Persia and went down in history as the ruler of the largest empire in the world. The ancient Romans focused on infrastructure in terms of military logistics. They covered their empire with a network of roads that have survived to our times, on which the Roman legions and carts with supplies moved. The same logistics that created the two mighty empires of the ancient world led to the defeat of the Crusades. The first of them was attended by the poorest classes and social outcasts, who, according to the promise of the then pope, were to receive forgiveness of sins in exchange for participation in the crusade. Unfortunately, none of its participants had any idea about the art of war, which led to chaos and disorganization in the "army" and shortages in the supply of troops, ultimately determining the defeat of the first Crusade. [Drewniak 2019]

The theoretical approach to logistics and military logistics began in the 19th century. The momentum with which Napoleon Bonaparte conducted military campaigns entailed the need for adequate logistical support. Antoine-Henri Jomini in "Summary of the Art of War" (1838) defined logistics as "the practical art of moving armies". According to him, logistics includes all the functions from administrative and planning to activities at the operational level (moving troops and equipment, building roads and bridges, intelligence and reconnaissance, supplying weapons and food, etc.). Jomini's Prussian counterpart, Carl von Clausewitz, who lived at the same time, disagreed with his approach to the matter, at the same time treating logistics as "servant services" for the army. In the 1880s, the American naval historian Alfred Thayer Mahan introduced logistics to the doctrine of the US Navy. Mahan noted the economic potential of the state in warfare, the importance of lines of communication, and the security of naval bases. According to its assumptions, it was necessary to conduct operations away from one's own shores. A large group of ships, whose main strength were battleships, was to inflict the greatest possible losses on the enemy. After winning the skirmish, it was necessary to block the enemy coast and sea ports. Mahan believed that military defeat had economic consequences, which weakened the enemy and accelerated his surrender. [Leighton] Lieutenant Colonel Cyrus Thorpe in 1917, in his work

"Pure Logistics", created a triad of the art of war consisting of strategy, tactics and logistics . For him, logistics is, apart from supplies and transport, also war finance, shipbuilding, ammunition production, etc. After World War II, Henry E. Eccles developed the "Thorpe's triad" additionally by intelligence and communications. Military logistics defined by HE Eccles is "planning and implementation of material and technical support for the national armed forces and creating appropriate social, living and health conditions to perform the tasks assigned to them" [Jałowiec 2020] . Polish logisticians also contribute to the development of the theoretical foundations of military logistics. M. Wasyłko considers military logistics as "an interdisciplinary discipline of knowledge, which, using the achievements of science, especially the art of war, economic, technical and other sciences, as well as the economic potential of the state, creates the foundations necessary to achieve and maintain the required level of combat capability and readiness of troops as well as life and service to the military community, and also provides conditions for optimal management of the resources allocated to the disposal of the armed forces in times of peace and in the event of a possible war". Poland's inclusion in NATO structures imposed certain obligations and standards on the Polish armed forces. Among other things, defining logistic security. Based on the "NATO Glossary of terms and definitions (2017)", the Doctrine of the Polish Armed Forces contains the following definition of military logistics: [Jałowiec 2020] "Military logistics is a field of knowledge covering the planning, preparation and use of means of supply, as well as the implementation of services and specialized services in order to maintaining the troops in the appropriate combat capacity within the territory of the state and securing the functioning of the troops performing tasks outside its borders. Military logistics covers the following aspects of activity:

- design and development, acquisition, storage, transport, distribution, evacuation, and withdrawal of means of supply;
- transportation of personnel and supplies;
- acquisition, construction, maintenance, maintenance and decommissioning of buildings and installations;
- obtaining and providing services;
- medical protection” .

There are many more than these definitions, but they all oscillate around one core, which is planning and organizing resources for military units and branches to meet their needs. The essence and importance of proper logistic support for troops was established on the basis of practice, battlefield experience, analysis of military victories and defeats. An

efficiently functioning system of supplying troops affects the outcome of battles and even entire wars, which in the long run translates into the security of the state and entire political regions. Nowadays, military logistics is perceived in a multidimensional way, encompassing the theory and practice of logistics security and covering six subsystems (management, material, technical, transport and movement of troops, military infrastructure, medical) and two functional areas (support by the host country - HNS - Host Nation Support and Mobilization and Strategic Reserves). [Jałowiec 2020]. The future of military logistics is related to the computerization of logistics processes in the army, coordination of logistics activities not only for the needs of the national armed forces, but also in the field of interoperability of the armed forces of the alliance countries and - most importantly - fast and safe flow of information between military units and those taking care of their needs logistic brigades.

Logistic support as the basis for efficient organization of military actions

Logistical support for the troops is an essential element enabling the proper functioning of the armed forces in times of peace, crisis and war. In the context of logistic support for troops, it is important to determine who and at what level is responsible for securing individual units. According to the NATO nomenclature, there are four levels of military security and logistic support. Levels I and II (tactical) refer to the protection provided for the battalion and from the unit to the tactical compound. They are carried out by the integral logistic potential of units at the tactical level, supported by the logistic potential of the types of armed forces. Level III (strategic and operational) covers the support and security of operations carried out by the logistic potential of the types of armed forces and the organizational unit of the Ministry of Defense responsible for logistic support of the Polish Armed Forces. The security at this level is the responsibility of the commanders responsible for commanding the types of armed forces and the commander/head of the organizational unit of the Ministry of Defense responsible for logistic support of the Polish Armed Forces. Level IV (political and military) concerns logistic support and security with the use of strategic logistic resources of the national economy in order to achieve the goal pursued at the national political level. The organizer of the functional logistics system of the Polish Armed Forces is responsible for responsibility at this level [Jałowiec 2020]. Due to the dynamic development of technology and changing operational conditions, the directions of development of logistic support for troops are constantly changing. One of the directions of development is the effective operation of logistics entities in a multinational environment, which requires the

adaptation of logistics procedures to the standards in force in NATO and the EU. It also requires increasing the flexibility of logistics systems. Tomasz Jałowiec in his monograph "Military Logistics Paradigms" listed seven directions of development of logistics support for troops and the functional system of logistics of the Polish Armed Forces. These directions include:

- effective operation of logistics entities in a multinational environment,
- guaranteeing the continuity of supply to military units and institutions in the country and abroad,
- ensuring the possibility of securing the operation of the Polish Armed Forces as part of the collective defense of the state and the acceptance and cooperation with allied forces,
- optimization of stationary logistics and the system of basing troops,
- the use of contractors (outsourcing) and the construction of an effective logistic system for military-civilian cooperation,
- rational management of logistics resources, full computerization of military logistics processes, allowing real-time tracking of organic and acquired logistics resources, and
- modernization of equipment and logistics equipment, a revolutionary technological leap.

The functional system of logistics includes six subsystems: management, material, technical, transport and movement of troops, military infrastructure and medical. These subsystems ensure continuity of support and logistic security for the troops in the training process and the performance of tasks. The management system consists of bodies dealing with management at the strategic, tactical and operational levels. The material subsystem is designed to deliver materials and provide specialist services for the army in times of peace and war. The material subsystem can use the current potential of the armed forces, but also with the support of external entities. The technical subsystem is responsible for the maintenance and operation of combat equipment. The troop transport and movement subsystem deals with planning and coordinating the preparation of the country's transport infrastructure for the needs of the troops in cooperation with the appropriate non-military authorities related to transport. The medical subsystem is a team of people and resources taking care of medical security and medical logistics in order to protect the health of the troops. In addition, there are two functional areas: Host Nation Support (HNS) (HNS support to NATO forces stationed or moving through its territory) and Economic Mobilization and Strategic Reserves. In addition to the above-mentioned areas, the logistics system of the Polish Armed Forces also consists of a national logistics management system, budget and

finance of operations, civil-military cooperation, environmental protection, burial of the fallen and the dead, and the organization of POW holding facilities [Jałowiec 2020].

The basic task of the military logistics system is to comprehensively meet the logistics needs of the troops. An effectively functioning logistics system is crucial for the functioning of modern armed forces. It is because of efficiency, both in the civil and military sphere, that external entities providing specialized services (outsourcing) are used. Military units use external entities (contractors) to release resources previously frozen in processes and focus on important issues for which the army has been appointed. The activities that the military may commission from contractors concern, among others: repair and washing of uniforms, production and delivery of weapons and ammunition, production and distribution of food and bottled water, staff training in the use of specialized equipment, delivery and service of ICT equipment [Jałowiec 2020] . Support from external contractors allows the armed forces to maintain their own, scarce logistic resources that can be used to perform other tasks or extend the self-sufficiency of the troops. In addition to the above-mentioned sources of logistical support, the armed forces are secured thanks to allied agreements and international pacts. Due to the dynamically changing environment and the complexity of the functioning of the armed forces, it is necessary to constantly improve the system. The systemic approach allows a holistic (comprehensive) look at the emerging problems of logistic support for the armed forces, which in the long run will result in the effective use and acquisition of logistic resources. [Jałowiec 2020].

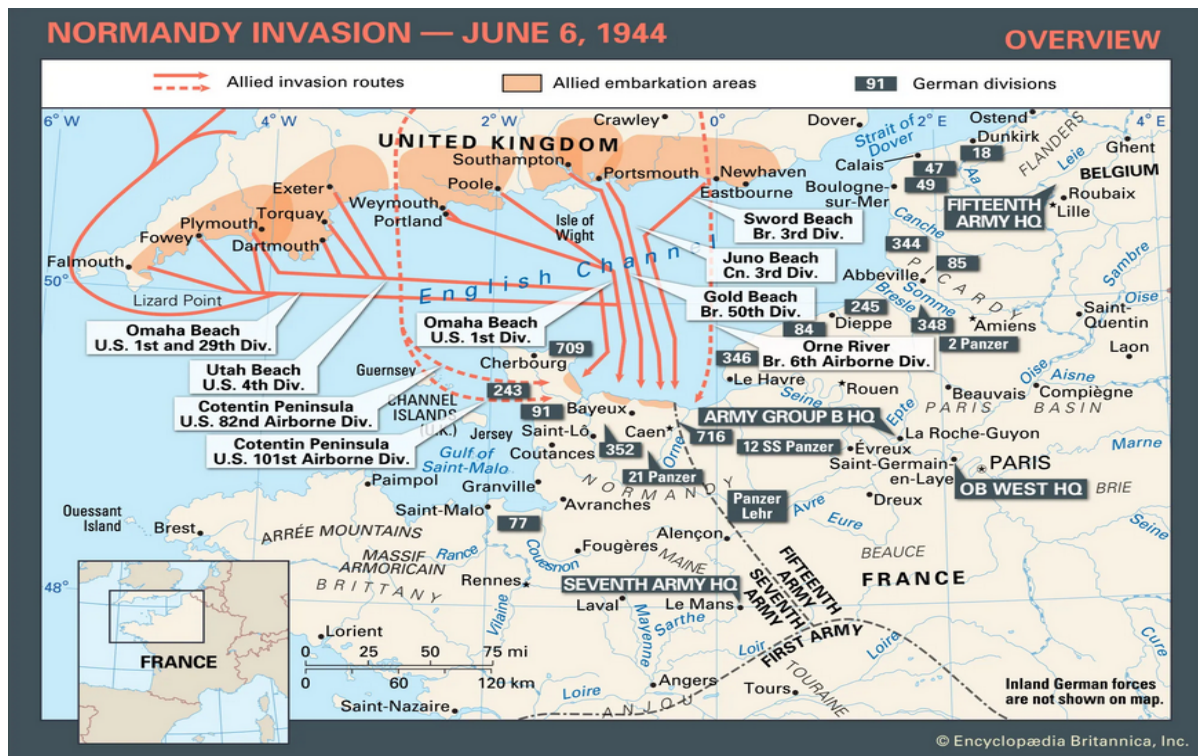
The Allied Campaign in Normandy: Origins, Course and Logistic

Operation Overlord began on June 6, 1944 with the Allied landings on Normandy. The purpose of the invasion was to create a second front in Europe and quickly end the war on the European continent. Therefore, on February 12, 1944, General DD Eisenhower was given a directive under which he became the commander-in-chief of the Allied forces and took responsibility for the supply and logistics of troops stationed on the European continent [Eisenhower 1998]. Military logisticians and the general staff drew up plans for the deployment of troops and their distribution on the beach according to the course of the supply lines. British and Canadian troops were to occupy the eastern (left) part of Normandy, and the Americans - the western (right) part. After the Battle of Normandy, making a great arc and facing east (Berlin), the British and Canadians were to be supplied from Britain via the English Channel, while the Americans were to be supplied from Mediterranean ports, to which arms, food and ammunition were supplied from ports in the United States. The ship's

name and destination were coded. The same as the marking of materials and warfare agents. The designation of the cargo and transport was to remain a secret to the enemy, who could seize or destroy supplies for the Allies. Goods on ships were loaded according to order of their unloading at the port of destination. Unfortunately. While the same loading in the United States or UK. Britain proceeded smoothly, but the port of destination was not without problems; According to Skarżyński (2018), “The failure to provide freight lists containing cargo data before the arrival of ships, the lack of accurate information about the composition of convoys and the schedule of approach of individual ships to specific anchorages made it impossible to unload them in the order resulting from the needs of the fighting forces”. In addition, extended communication lines also caused delays in deliveries. At the end of August, the distance between the beachheads and the front line was 300 miles (482 km) [Skarżyński 2018].

Finally, on June 6, 1944, the Allies launched the largest landing in history. They sailed from English ports on landing barges towards the coast of France. The operation of the land forces was accompanied by bombardment of German positions and artillery fire from ship guns. The Allies landed on five beaches: Utah, Omaha, Gold, Juno, and Sword. 86 divisions took part in the Normandy landings in 1944:

- 16 British and Canadian (6 armored, 9 infantry, 1 airborne)
- 7 French (3 armored, 3 infantry, 1 mountain),
- 1 Polish (armored),
- 62 US divisions (15 armored, 43 infantry, 1 mountain, 3 airborne).



Map. 1: Allied landings in Normandy

<https://www.britannica.com/event/World-War-II/Developments-from-summer-1944-to-autumn-1945>, 12/04/2023

The Americans and British landed in Normandy and fought fiercely. In order to provide a place of unloading for ships with supplies, the priority after capturing the beach in Normandy became the capture of the port of Cherbourg on the Cotentin peninsula and the port of Brest - Breton peninsula. Unfortunately, the Germans defended themselves fiercely and the port cities were under the control of the Wehrmacht for a long time, so the construction of artificial ports began, i.e. Mulberry at Omaha Beach (a 2-mile water tank with a capacity of 5,000 t/day and 1,400 vehicles/day). Unfortunately, during the ongoing storm on June 19-22, 1944, Mulberry was destroyed, which resulted in the loss of 20,000. vehicles, 140,000 t of cargo and prevented the landing of 83 thousand. American soldiers. In turn, in order to seize the port on the Breton peninsula, from where supplies for the Americans were to be received, General Eisenhower directed the 3rd Army under the command of General Patton to Brest and Nantes. Unfortunately, the logistical capacity of the port there was insufficient, so the high command decided to plan an operation to capture Cherbourg; Allied operations led to the crossing of the Cotentin peninsula and the encirclement of Cherbourg, whose crew surrendered on June 27. Unfortunately, the port infrastructure was either mined or blown up. By August '44, sappers managed to restore the port to use, thanks to which it became possible to reload equipment and troops. In November, 433,000 tonnes were unloaded there. combat

and material resources. From June 6 to June 30, 1,050,000 were transferred to American troops in France. tons of supplies from the USA, 1680 thousand. t UK UK and 501,000 from the Mediterranean basin. At the end of June '44, 289,827 tonnes of supplies were moved to the beaches of Normandy [Skarżyński 2018].

Another important logistical issue was to organize and maintain a transport system that would supply troops on the battlefield. On July 31, 1942, the US Department of War established the Transport Corps, which at the end of 1944 had 198 transport companies at its disposal, 14 of which were intended for the transport of fuels, oils and lubricants. The diversified transport system of the Allies made it possible to plan the supply process depending on the needs and the current situation at the front. But despite the variety of modes of transport used, each mode had its advantages and disadvantages. First of all, the destroyed infrastructure as a result of bombing raids organized by the Allies and attempts to destroy property by the retreating Germans (railway tracks, cranes and port and railway cranes, bridges over rivers, marshy terrain and flooded roads) delayed supplies to the army. In this case, sappers and engineers played a key role, clearing the area, restoring ports, and building roads and bridges over rivers [Skarżyński 2018].

The Allied transport system consisted of the following branches of transport:

- railway transport,
- air Transport,
- car transport.

In September 1944, a railway line was opened, along which a special freight train, the so-called Toot Sweet Express from Cherbourg and Paris with a handling capacity of 20,000 tons t/day (February 12-18, 1945, 3,099 tons were transported in 240 wagons). The Meat Ball Express, which has been carrying perishables for the U.S. 1st and 9th Armies since March '45. Deliveries to the army were also carried out by air transport. For example, the 3rd US Army received 1,200 tons/day of supplies, but from mid-August to mid-September - 500 tons/day. The planes were not economical. For every 7.6 liters of car gasoline delivered, there were 11 liters of aviation gasoline. When it was impossible to use rail and air transport, engineer troops built roads and bridges especially for motor vehicles, specially marked in English and French. The movement of vehicles The Red Ball Express was looping at approximately 25 mph. and at 60 yard intervals. As the front line advanced eastward, the distance from the port of Cherbourg to the forward supply points increased. At the peak of Red Ball Express operation (August 29, 1944), it consisted of 132 transport companies, with 5,958 trucks with a total maximum transport capacity of 12,342 t/day. Red Ball Express served the St. Lo-

Chartres in the period 25.08-16.11.1944 and during this time transported 412,193 tons. The fuel consumption of the Red Ball Express was 300,000. gallons/day. Depending on the operational and tactical needs, further lines of motor vehicles were launched. Other motor transport systems on the Western Front in 1944 include:

Table 1. List of car lines used during the campaign in Normandy

Name	Period of operation	Route	Transport performed [tons]
Green Diamond	October 14-October 31, 1944	Cherbourg-Dol	15590
White Ball Express	6.10-13.12.1944	Le Havre, Rouen-Paris	140486
ABC Express	November 30-December 31, 1944	Antwerp-North Front	51535
Lion Express	September 16-October 12, 1944	Bayeux-Brussels	17556

Source: M. Skarżyński, American Logistics in the World Wars 1914-1945, Kalisz 2018, p. 141

However, car transport had its drawbacks. Cars supplying soldiers on the battlefield were constantly in use, which prevented technical inspections, and the drivers of these vehicles were tired of monotonous work, which led to simulated diseases, attempts at sabotage and the sale of property on the French black market. A major change in road transport was the replacement of trucks with a load capacity of 2.5 tons for tractor units with semi-trailers with a load capacity of 10 and 12.5 tons. As a result, deliveries to the four US armies increased to 12,000. t/day of supply, and at the end of April this number increased to 15 thousand. t/day [Skarżyński 2018].



Photo 1. A US Army "Red Ball Express" truck fell into a ditch on the side of the road; GMC CCKW 2 1/2 ton 6x6 transporters lined up along the road as the GMC AFKWX tractor struggled to free itself, France, 1944
https://ww2db.com/image.php?image_id=5952, 2023-04-21

However, the war is not over yet. Operations on the Western Front continued; The 1st Polish Armored Division encircled the Germans at Chambois, and Paris was captured on August 25. In the south of France, the Allies made another landing; American divisions captured the cities of Saint Raphael, Saint Maxime, Saint Tropez, while French troops captured Toulon and Marseilles. Once the situation in Normandy and southern France had stabilized, there was a race towards the German border. The Germans had retreated behind the Siegfried Line and the ports in enemy hands made it difficult for the Allies to supply them. They took Le Havre on September 12, and Bolognes and Calais on September 30. The Germans took up positions on the Siegfried and Rhine lines. The pursuit of the Wehrmacht was hampered by fuel shortages. Ports that could solve this problem were still in the hands of the enemy and defended fiercely as fortresses, such as Dunkirk, Lorient, Saint Nazaire, La Rochele and Royan. The logistic problem related to liquid fuel shortages was partly eliminated thanks to the PLUTO (Pipe Line Under The Ocean) operation. It consisted in stretching 17 pipelines on the bottom of the English Channel. The first 217 km of the pipeline

was manufactured in the USA, from where it was transported to the UK. Britain, where it was wound on spools with a diameter of 18 m and a width of 27.5 m. Then, along with the advancing army, the pipeline was stretched as far as Emmerich on the Rhine. From June 6, 1944 to February 28, 1945, a total of 2,352,875 tons of petroleum products were sent via this system. The fuel flowed to filling points for tanker barges, railway and road cisterns as well as mobile tanks and canisters. From there, the propellant was transported to the front line using 5-gallon canisters. The command predicted the need for new canisters at the level of 800,000 pieces per month. And despite the accumulation of 12 million units by the Americans before June 6, unfortunately, there was a shortage of metal packaging for propellants, which had an impact on the course of Allied military operations. To remedy this, the following actions have been taken: deliveries of canisters from the US and UK have been increased. Great Britain, soldiers were encouraged to return empty packaging, and production in France and Belgium was increased [Skarżyński 2018].

Sometimes there were situations where operational activities at the front proceeded at such a dynamic pace that the transport companies could not keep up with the supplies. Lines of communication lengthened, and ports remained in enemy hands. Such a situation took place at the beginning of September '44, where the Allied forces too quickly reached the frontier, which according to forecasts was to be reached a few months later. As a result, lines of communication became longer and there were shortages of supplies. General Patton's 3rd Army found a great solution to this problem [van Creveld 2014]:

- draining fuel from trucks for the return journey,
- impersonating other units,
- observing supply convoys in order to take them over later,
- abandoning redundant equipment, including parts of uniforms,
- continue military operations until the fuel tank runs out.

The increase in the need for food, water and clothing was exacerbated by the fact that these resources were needed in POW camps, field hospitals and residents of cities and towns destroyed during the siege. In addition, more troops flowed to the Western Front to replace those wounded or killed. From 26.09 to 16.12 there was a chronic shortage of supplies (ammunition, propellants, warm clothes and shoes). Deliveries of warm clothing did not arrive in sufficient quantity as front-line units underestimated needs, and shipments of ammunition and propellants were prioritized over shipments of winter clothing.

In order to weaken the economic potential of the Third Reich, General B. Montgomery wanted to take over the Ruhr area. The plan for Operation Market Garden was to move three

airborne divisions into enemy territory and capture the bridges over the Rhine and Meuse rivers until the XXX Corps of the 2nd British Army arrived. The Allies failed to do so, and the Polish troops in action were blamed. Although the failure was influenced by the following factors:

- 1) The Germans intercepted operational plans from the crashed glider;
- 2) Insufficient amount of equipment for the landing troops (the English first echelon got 21 tons of equipment instead of 390 tons);
- 3) Lack of communication between the British unit, which was supposed to hold the bridges, and the Poles, who landed second [Drewniak, 2018].

On another stretch of the front, the Allies were successful. The First Canadian Army recaptured the islands occupied by the Germans from the Germans, thanks to which the port of Antwerp, captured on September 4, could be used to reload supplies and evacuate the wounded. This event definitely improved the supply situation of the Allies, as more combat assets could be delivered to the soldiers at the front [Skarżyński 2018].

During the German counteroffensive in the Ardennes, the Americans defending in Bastogne received 10,800 tons of supplies and support in the form of 67,236 soldiers. And it's all thanks to trucks with a load capacity of 2.5 tons and tractor units with semi-trailers with a load capacity of 10 tons.

In his memoirs, General Patton claims that the best clothes should be simple, not out of shape. Boots made of leather inside out, thick and sturdy woolen trousers, a double-thickness woolen shirt, and a cap under the helmet. In winter, the soldier must be provided with a waterproof coat with a lining and gloves. In addition, as the general himself recalls, he himself proposed changes in deliveries during the meeting of the 12th Army Group on October 10, 1944. According to his idea, instead of forecasting needs and making deliveries on this basis, deliveries should be made according to current consumption, and before the moment of delivery inform recipients about the and supply mix, so you know what resources to save. In supply planning, it was decided to move away from the vague unit of fire (jo), and replace it with a more precise number of bullets fired per unit of time. For example, for 105 mm guns - 60 rounds/day, for larger caliber - 40 rounds/day. Thanks to the rhythmic, daily deliveries, it became possible to save missiles for the period of the toughest battle [Patton 2006].

During World War II (compared to World War I) the mortality rate among wounded soldiers was half that. The well-functioning wounded evacuation system and field hospitals operating in the rear of the division were responsible for this. The bane of a soldier in the

trenches of war was soaked boots and socks that made him sick. Some divisions were withdrawn so that the soldiers could dry their clothes and rest. In some wards there were special drying rooms for drying clothes and socks [Patton 2006]. The final stage of the war in the Western European theater of war was the great offensive in the form of crossing the Rhine, which consisted of three phases and in each phase the attack fell from a different direction on different cities. After crossing the Rhine, the Allies advanced in three directions, encircling Berlin and other defending German cities, to the designated occupation zones, where they encountered more capitulating Wehrmacht troops and the Red Army advancing from the east. The war was coming to an end, and on May 8, 1945, the Third Reich signed the act of surrender, thus ending World War II on the European continent.

Resume

Logistics in its practical aspect dates back to ancient times. Logistics constantly accompanied the war, deciding about success or failure, which has a colossal impact when it comes to the security of the state or entire regions. In the past, due to lack of supplies, the besieged surrendered and battles were lost. With logistical support, the Normandy campaign and Allied operations on the Western Front were successful, shortening the duration of World War II and saving many lives. Nowadays, cooperation within military alliances and conflicts in various parts of the globe pose many challenges for logistics specialists regarding army supply. Both own - domestic and allied forces. Logistical activities and military operations are inextricably linked. Development of logistics as science and technology, e.g. of information streamlines logistics processes and is a factor increasing the competitiveness of entities.

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