Arctic transportation systems during World War II

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Abstract. The Lend-Lease program was the main international project on freight logistics in the Arctic during World War II. Delivering military and food supplies from the Allies became the key aspect of collaboration between the USSR, UK and USA. The Northern Sea Route was one of the main Lend-Lease transportation modes, allowing to deliver approximately 22.7% of all supplies to the USSR. The supplies mostly consisted of non-military goods (e.g. food), while military goods were presented by a smaller portion. Northern Sea Route was passing through the Norwegian and Barents Seas to Arkhangelsk and Murmansk. Even though it was relatively short, Northern Sea Route had some significant disadvantages. For instance, ships carrying supplies from the Allies would encounter with Nazi aviation and fleet based in Norway and Finland in a combat zone. The Soviet Union had to improve harbours’ infrastructure in Arkhangelsk and Murmansk to increase its capacity, which would require various transportation means including icebreakers and tugs, as well as handling equipment and workforce. Moreover, the Arctic convoys had to endure severe weather conditions, as hurricanes and tidal waves in autumn, polar night and drift ice in winter. Nevertheless, the Northern Sea Route played a vital strategic role as the main transportation system for the Soviet Union in 1941-1942, the most difficult period of World War II.

1. Introduction
Lend-Lease program was the main international project on freight logistics in the Arctic during World War II. It was aimed at collaboration between the Allied Powers to deliver military and food supplies to the USSR.

2. Main body
The Allies expressed their willingness to provide military and economic support to the USSR in June 1941 [1]. In one of his radio speeches, Winston Churchill urged the Allies to “give whatever help we can to Russia and the Russian people” [2]. Franklin D. Roosevelt also declared his support for the USSR. He described the USSR defence as a vital part of the US defence in his directive to Edward R. Stettinius, the administrator of the Lend-Lease program [3].

These statements of the UK and USA marked the beginning of their diplomatic cooperation against Nazi Germany. The US Congress passed the Lend-Lease Act on March 11, 1941. According to this Act, the USA would lend or lease munitions, weapons, transportation, industrial equipment, raw materials and food, which was required for successful military operations, to the Allied Powers.
The scope of the Lend-Lease Act included the USSR on November 7, 1941, while before supplies from the Allies had been either paid in cash or covered by loans. The Moscow, Washington, London and Ottawa Treaties ensured transportation deliveries until the end of World War II. The USSR and UK signed a formal military alliance agreement against Nazi Germany on July 2, 1941. The decision of providing the USSR with munitions and strategic sources and the USA and UK with raw materials from the Soviet Union was taken in the First Moscow Conference on September 29 – October 1, 1941.

The USSR and USA started negotiating their first agreement in June 1941. The US President’s closest advisor on foreign policy, Harry Hopkins, visited Moscow to assess the current situation of the Soviet-German front line. The joint agreement was signed on July 12, thereby forming the Allied Powers. As the result of Hopkins’ visit, the USA promised to supply 200 aircrafts to the USSR and subsequently a 145-million-dollar agreement for military supplies was signed in August.

The First Protocol, signed during the First Moscow Conference on October 1, 1941, ensured military support for the Soviet Union. According to this Protocol, there would be more than 70 types of supplies including munitions, weapons, raw materials and medical goods [4]. Additionally, the USA and UK would provide a monthly supply of 400 aircrafts, 500 tanks, 200 anti-tank rifles, 2000 tons of aluminium, 7000 tons of lead, as well as other raw materials and military supplies from October 10, 1941 to June 30, 1942 [5].

By the mid-1942 there were 1903 aircrafts, 2314 tanks and 1550 tankettes delivered to Arkhangelsk and Murmansk by the Northern Sea Route. Thus, the USSR Ministry of Foreign Economic Relations considered the agreement fulfilled. It must be noted that deliveries from the Allies accounted for a small percentage of total industrial production in the USSR; however, it was significant in terms of specific types of weapons and raw materials.

In fact, military supplies accounted for a smaller percentage among all deliveries to the USSR, while food supplies, non-ferrous metals, petroleum products, chemicals and industrial equipment accounted for a more significant part. They were crucial for supporting its own military production in the Soviet Union.

In return, the USA started receiving strategic commodities and valuable materials, such as chrome, manganese, platinum, gold and wood as a part of the Lend-Lease program. Moreover, it entailed free-of-charge repairment for the US ships and some other related services in the Soviet Union harbours. The Lend-Lease program facilitated the growth of military production, agriculture and food industry, creating new employment opportunities in the USA. It was the only country among the Allied Powers that experienced a significant economic growth after World War II. As Edward R. Stettinius, the administrator of the Lend-Lease program, pointed out “we have sent 347 million pounds of meat, while the whole production has increased to 511 million pounds since March 11, 1941”, which indicates an increase in food production in for the US citizens [6]. According to the Lend-Lease program, millions of dollars were invested in new factories, plants, shipyards and other industrial facilities, which proved to be crucial for in the US economic growth. These resources were spent on restructuring civilian enterprises into military ones [6].

At the same time, however, the delivered supplies were of poor quality. Indeed, Stalin wrote to Roosevelt on November 8, 1941 that “the tanks, guns and aircraft are badly packed, some parts of the guns come in different ships and the aircraft are so badly crated that we get them in a damaged state”.

The Northern Sea Route became one of the main transportation routes for the Lend-Lease program. It was passing through the Norwegian and Barents Seas to Arkhangelsk and Murmansk [7]. The route was relatively short considering that the ships of the Allied fleet would pass it in 10-14 days. Besides, the northern harbours were close to the Soviet Union centre and front line. The Arctic convoys delivered military, food and other suppliers from the Allies, including 7000 aircrafts, 500 tanks, lorries, fuel, metals, chemicals, medical and food among others. 3964 thousand tons or 22.7% of all supplies from the allies were delivered by this route.
However, the Northern Sea Route had some significant disadvantages, such as Nazi aviation and fleet based nearby, transportation difficulties and harbours’ low capacity. Nevertheless, the Northern Sea Route was the most effective among all the Lend-Lease transportation modes in 1941 – early 1942. Only in 1941 alone 7 convoys with 54 transportation types passed this route, including Dervish and PQ6 without significant losses. In total 41 convoys with 738 transportation types from the Allies entered the Soviet harbours in 1941-1945 [8].

As the USSR didn’t have enough freighters to deliver military supplies, the UK and USA committed to support their transportation. Usually, each Arctic convoy included seven or eight freighters. Corvettes (e.g. destroyers, minesweepers) were responsible for a close-in defence, while heavy cruisers protected the convoys from Nazi surface combatants and aviation closer to the shore. The UK battleships were a part of the Allied convoy’s defence. After PQ-17 was destroyed, so called “drip” runs were introduced (transportation vessels would sail each several hours without any protection). Till the end of 1942 all the Allied convoys going to the USSR were indexed PQ and returning ones – QP. After 1942, they were indexed JW and RA respectively.

First Arctic convoys arrived in Arkhangelsk and Molotovsk, as Murmansk railway station was under the enemy’s control. Murmansk started receiving deliveries in 1942. The first Arctic convoy Dervish became a manifestation of a military cooperation between the USSR and UK, arriving in Arkhangelsk without any losses on August 31, 1941. The convoy was formed in Liverpool, while ship distribution was completed in Island. It consisted of a Dutch and 6 British ships carrying mines, bombs, firearms, food and medical supplies, wool and rubber that was very important for the Soviet Union industries. Besides, the convoy was carrying lorries and 16 disassembled Hawker Hurricane fighter aircrafts. They were allocated evenly to avoid a complete loss of any item in case of an attack.

By the end of 1941 the Allies sent 10 more convoys in both ways. They had to encounter with Nazi aviation and fleet based in Norway and Finland in a combat zone. The ice-free harbour in Murmansk and a front line were just several dozens of kilometres apart. The Nazi Aviation started heavy bombing of the Arctic convoys and raids on Murmansk in March 1942.

The Allies got their first wake-up call on January 2, 1943, when fascist submarine U-134 sank a trade ship Waziristan from the convoy PQ-7a. Then, on January 17 U-454 sank a destroyer from the convoy PQ-8. Only two marines survived – it was the first loss for the British Navy.
The Nazi Fleet led by the famous battleship Tirpitz started patrolling the Northern Sea Route to intercept the Allied convoys, because of which the Soviet Union bore the first casualties among its navy. This worried Churchill, that’s why he gave the following message in his speech on January 25: “Destroying or at least damaging this ship would be a remarkable event in modern naval warfare. There is no other aim comparable to it. If it is damaged, the battleship won’t be able to return to Germany… The power equation will change everywhere, even in the Pacific. All our strategy depends on this ship now, as it not just paralysis four main British battleships, solely by its existence, but also two new American battleships in the Atlantic” [9].

In March 1942 Tirpitz tried intercepting the convoy Q-12; however, it failed due to its strong defence and heroic actions of the crew of an old ship Ijora that was a part of the convoy QP-8 coming from Murmansk. Ijora was behind the convoy due to its engine malfunctioning, when it was detected by a fascist patrol and consecutively sunk by its destroyer Friedrich Ihn. Ijora’s captain, Belov, managed to warn the convoy. His signal was received, and therefore PQ-12 avoided confrontation with Tirpitz; however, Ijora’s crew had to sacrifice their lives to achieve this. Tirpitz was attacked by torpedo bombers from HMS Victorious the following day, yet it didn’t sustain any significant damage. Tirpitz was attacked and damaged by British midget submarines on September 22, 1943. Further, in April, May and September 1944, – by Royal Air Force and finally it was sunk by bombers on November 12, 1944.

The Allies bore considerable losses, for instance, PQ-13 lost 4 vessels and a defence ship. Nevertheless, the convoy arrived in Murmansk. PQ16 lost 6 vessels the enemy’s aviation at the end of May [6].

There was a break out of heavy fighting in the Arctic in the first half of 1942, because of which the Allies lost 57 vessels and 6 battleships. One of the most devastating tragedies associated with the Arctic convoys involved PQ-17 that started its way on June 27, 1942. Once Nazi submarines, battleships and dive bombers appeared, the UK Admiralty ordered the convoy to scatter and the cruisers to turn back to avoid losses. The convoy, left without defence, was destroyed by the enemy completely. As a result of the increase in both military and trade losses and PQ-17 tragedy, the number of the Allied convoys decreased. Therefore, the supply volume decreased, and it had reached its lowest figures of 245 097 tons by 1943, which accounted for only one third of 1942 figures.

The transportation challenges often resulted in supply disruptions. The Soviet Union had to improve harbours’ infrastructure in Arkhangelsk and Murmansk to increase its capacity, which would require various transportation means including icebreakers and tugs, as well as handling equipment and workforce.

The Arctic issue was repeatedly put before the State Defence Committee for consideration due to the constant military threat. The Committee discussed possible measures on increasing Arkhangelsk harbours’ capacity during its session in 1941 and consecutively decided to strengthen convoy’s defence on October 10, 1943.

The Arctic convoys had to endure severe weather conditions, such as hurricanes and tidal waves in autumn, polar night and drift ice in winter. Thus, the deliveries were accompanied by certain recurring constraints, including commodity transportation.

The participants had been experiencing all challenges that the Arctic had to offer from the very beginning. There were frequent comments on weather conditions in their memoirs. As Brian Schofield mentioned “The weather was terrible, when we were crossing the Barents Sea with the convoy. We had to endure fog and snowstorms which buffeted us all the way; however, it played into our hands now and then, as it made reconnaissance aircrafts’ work nearly impossible, though they would notice a convoy at times” [10].

Virgil Sharp, one of PQ-15 participants, wrote that “the Arctic is famous for its storms in March. We found ourselves in the middle of one. It felt as if it was never going to end. The air temperature was relatively low, yet the ship suffered no icing. Nevertheless, we faced squalls from time to time. Our ship was literally standing on end, as well as all the convoy” [11].

It was extremely challenging, nearly impossible, to sail in the Arctic high aptitudes. The convoy was forced to perpetually manoeuvre to avoid drifting icebergs. Decks were covered with up to 6 inches of
ice, so the crew had to be outside, clearing away the ice. They wore all the clothes they could find to keep themselves warm. The crew noted in despair that “they hadn’t known what truly cold weather felt like, before they saw a wave transforming to a block of ice in a blink of an eye. The entire ship was covered with ice in less than 30 minutes, thus, the artillery was out, and they couldn’t use the deck”[10].

Alistair Stuart MacLean, a Scottish writer, participated in some of the Arctic convoys. He described a day spent afloat as full of tension and mortal danger as “people wouldn’t sleep for more than 2 days, while temperature and pressure were steadily decreasing. Waves were becoming higher and steeper, while hollows – deeper; bone-chilling wind was bringing the clouds of snow, creating opaque mist. It was a rough, sleepless night not only for the ones who was on deck but also for the ones inside. The ones who were on duty, a first officer, helmsman Carpenter, signalman, spotter and messengers, became numb with bitter cold. They were staring into the distance in complete disbelief that warm and comfort exist in this world. Even though the crew wore all the clothes they could possible find – sweaters, jackets, overcoats, raincoats, scarves, pads and earflaps, they were trembling with cold. Everyone was hiding their hands under their armpits and putting their feet on warm pipes. The ones who were working with antiaircraft guns, couldn’t stop shaking and swearing. Commodores were trying to get inside Oerlikons’ sockets to reach installed heaters, trying to fight their most vicious enemy – sleep… It was damp, stuffy and terribly cold inside, all of which created the perfect conditions for tuberculosis – the main concern of the medical service head, Brooks. Moreover, pitching-heaving motion and abrupt trembling made sleep impossible, and even when they were falling asleep for several precious minutes, the stayed restless”[12].

According to the Second Protocol, the amount of supplies to the Soviet Union was supposed to increase significantly. In doing so, a new route had to be established, and thus the importance of the Northern Sea Route started decreasing. Its share in total supplies dropped from 61 to 16% by mid-1942; however, gross tonnage increased and reached 986 thousand tons [7]. There were 192 transportation types delivered to the USSR by the Northern Sea Route between July 1942 – December 1943. In return, 168 convoys were sent to the Allies. As in the past, military supplies accounted for a smaller percentage among all deliveries. Non-military, mostly food, supplies were accounted for the rest of the deliveries. It should be noted that these supplies were crucial for achieving a breakthrough point in World War II.

3. Conclusion

The highest number of vessels was delivered for the UK and USA in 1944-1945, after Nazi aviation and fleet became less active in the Arctic. There were 9.9 million tons delivered to the USSR, which accounted for 22% of all supplies. Thus, the Northern Sea Route was essential in delivering supplies to the USSR from the Allies during World War II. The Arctic convoys organization is an excellent example of their economic and military collaboration. However, the Allies bore significant losses in the Arctic, as well. They lost 90 out of 800 trade ships, approximately 5600 marines form the Northern convoys died in combat. The USSR alone lost 20 submarines, 2 destroyers, 9 battleships and many aircrafts. As for human casualties, they reached 30 thousand people [13]. The history of Arctic convoys is relevant in the historiography of World War II, along with the problems of studying the blockade of Leningrad [17], occupation of the territories of the Soviet Union, everyday life, the development of propaganda [15], the partisan movement [16] [14] and many others.

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