ENGINEER OPERATIONS IN THE

RHINE CROSSING

NINTH U S ARMY
1945

NINTH ARMY ENGINEER OPERATIONS

IN

Rhine River Crossing

PREPARED BY NINTH U.S. ARMY — JUNE 30, 1945

[redacted]

FOREWORD

The Rhine River has been long recognized as one of the most formidable obstacles to military movement on the European Continent, and its crossing was the object of the most intensive planning and preparatory effort made by Ninth Army while operating in the European Theater. The brilliant fulfillment of the Engineer mission in the assault crossing of that river will ever be a tribute to the fighting spirit, skill and determination of the officers and men who achieved it.

In addition to the outstanding accomplishments of those directly engaged in the crossing, the unfailing enthusiasm and technical proficiency of supporting Engineer elements played a major part in the success of the operation. It is regretted that the complete story of the actions of some of these supporting units had to be, of necessity, subordinated to those of the assault units in this report of the crossing.

Effort has been made to make this report of value to the student of military operations, as well as of interest to the casual reader. It is hoped that proper credit has been given to all units directly or indirectly involved in the operation, as well as to the staffs of all echelons for the weeks and months of planning without which the successful attainment of the mission would not have been realized.

/s/t/ RICHARD U. NICHOLAS
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SECTION I

MISSION

1. Army.

Initial planning was begun in October 1944 on the assumption that the mission of Ninth Army would be to cross the Rhine River north of the Ruhr industrial area, with tentative crossing limits informally established by Twelfth Army Group as Orsoy on the south, and Rees on the north, both inclusive (See Inclosure 1). The target date for the crossing was set at 15 December. These tentative instructions formed the basis for all planning for the crossing until early December. Successively later dates were set as the crossing of the Roer River and advance to the Rhine were postponed.

The above crossing limits would have provided sufficient front for a crossing by two corps abreast. In February, after Ninth Army had been placed under operational control of British Twenty-First Army Group, the northern limit of the Ninth Army zone was established at Wesel, exclusive. This narrowing of the Army zone neccessitated revision of planning to a crossing by one corps.

In addition to effecting a crossing within the Army zone, Ninth Army was given the mission of constructing three tactical bridges, a heavy ferry and a semipermanent fixed bridge across the Rhine River at Wesel, and of clearing highway routes through Wesel in conjunction with British Second Army.

2. Corps.

Due to the fluid situation which developed as a result of the rapid advance from the Roer River to the Rhine, early decision could not be made as to which corps would make the Rhine crossing. To avoid loss of time in planning, and to avoid duplication of effort by having each corps prepare detailed plans for a crossing, the XVI Corps was directed to prepare a plan which could be used by whichever corps was given the crossing mission.

A planning directive to XVI Corps, containing an Engineer Annex, was issued 19 February 1945. A copy of the directive is included as Inclosure 2.

Although the Commanding General, XVI Corps, had been informally advised earlier that XVI Corps would probably make the assault, it was not until 4 March 1945 that the XVI Corps was officially assigned that mission with target date of 31 March. The crossing date was later revised to 24 March, materially shortening the time allowed for physical preparation.

The mission of the XVI Corps was to assault across the Rhine River in the zone shown on Inclosure 3; secure an initial bridgehead; expand the bridgehead rapidly by seizure of successive objectives; secure and hold the general line: confluence of Ruhr and Rhine Rivers – Rhein-Herne Canal to Osterfeld – Bottrop – Gladbeck – Marl – North to Lippe River (See Inclosure 1); maintain contact with British Second Army; and seize intact, wherever possible, bridges over the Lippe River and Lippe-Seiten Canal.

3. Army Engineer Combat Groups.

A meeting of Corps Engineers and Army Engineer Combat Group Commanders was called at Army Engineer Headquarters on 24 November 1944, at which general planning was initiated. Tentative assignment of tasks could not be made at that time due to lack of a definite Army mission, but all were brought abreast of the status of planning by the Army Engineer, probable availability of engineer equipment, and of the proposed delineation of tasks betwen Corps and Army engineer units.

On 25 February 1945, when the Army engineer mission, final allocation of engineer troops, and information on the status of stream crossing equipage were sufficiently well established, assignment of definite tasks to Army engineer combat groups was made in an Army engineer planning directive, a copy of which is appended as Inclosure 4. The only major deviations from the plan outlined in this directive were the attachment of the 1103d Engineer Combat Group to XVI Corps on 8 March 1945, and the reassignment of the task of construction of the fixed bridge at Wesel from the 1147th to the 1146th Engineer Combat Group.

SECTION II

INTELLIGENCE

4. River Characteristics.

Systematic study of the Rhine by Ninth Army began 23 October 1944, when an officer and two men from the Engineer Section of the Ninth Army Photo Interpretation Detachment began a detailed bank study of the river from Cologne to Emmerich. This study, completed on 4 November, was the foundation of early planning. The collection of intelligence pertaining to the Rhine was continuous thereafter.

The first Ninth Army intelligence report on the Rhine, Preliminary Rhine River Intelligence, distributed at the 24 November meeting of Corps Engineers and Army Engineer Combat Group Commanders, furnished sufficient preliminary data on characteristics of the river to enable units to begin planning for tasks which might be assigned them. Sets of low oblique and vertical aerial photographs of the river were also furnished to units at that time.

The collection of data on the Rhine was continued, culminating in the distribution on 5 February 1945 of a comprehensive report, "Army Engineer Technical Notes No. 3, Rhine River." Much of the information contained therein had previously been furnished subordinate units informally, as it had become available. This study contained the following data:

a. Channel location from Cologne to Emmerich.
b. Areas subject to flood.
c. River profile.
d. River cross sections.
e. Stage hydrographs, 1920-1940.
f. Stage frequency curves based on records, 1812-1939.
g. Monthly maximum and minimum gauge readings and fluctuations for 3, 5, and 10-year periods based on records, 1812-1939.
h. Stage-discharge curves and velocity-frequency graphs based on records, 1909-1935.
i. Curves showing time sequence of equivalent stages based on records, 1812-1939.
j. Photo maps of area of interest, scale 1: 12,500.

5. Shore Characteristics.

The Ninth Army Photo Interpretation Detachment made a detailed study of approach and exit roads, restrictions to cross-country movement, dike locations, and the extent of flooding as shown by aerial photographs taken on three selected days when the Rhine was in various stages of flood. These data were included in Army Engineer Technical Notes Nos. 9 and 11, published on 1 and 6 March, respectively. "Going Maps", scale 1: 25,000, previously had been published on 11 February to show graphically the restrictions to cross-country movement.

6. Flood Warning.

It was recognized by Headquarters European Theater of Operations that a flood warning system would be required. An organization, and procedure for collecting and disseminating information were discussed at meetings held at Theater Headquarters on 18 and 19 December 1944, and at Headquarters Twelfth Army Group on 5 January 1945. A flood prediction service was established by Theater Headquarters and, in order to test the flood warning communication net, three sets of dummy stage readings were sent to it daily commencing 8 January. Between 1 and 7 March gauges were established at Neuss by the XIX Corps, and at Homberg by the XIII Corps. Farther upstream the First, Third, and Seventh Armies also had established gauges.

The prediction of stages in Ninth Army zone and readings of selected gauges were telephoned immedately upon receipt to all Corps Engineers and to those Army engineer combat groups which had bridging assignments for the Rhine River crossing. A chart indicating actual readings at the main gauges, together with predictions, and graphs showing levels during the operation are attached as Inclosure 5. Army Engineer Technical Notes No. 13, showing stage relationships between the Orsoy and Wesel gauges and the Army bridge sites, were issued on 18 March after the bridge sites had been selected, to enable units to transpose predictions for the main gauges to the sites.

7. Supplementary Measures.

Intelligence on enemy defensive capabilities, such as floating mines and Gamma swimmers, and the results of river crossing experiments conducted by Ninth Army units and by other Armies were constantly disseminated by means of Engineer Intelligence Summaries and special studies. The S-2 sections of XVI Corps Engineer units were detached from their organizations as soon as the west bank of the Rhine had been cleared of the enemy and were placed directly under the Corps Engineer. This group of Engineer S-2s reconnoitered the entire area, ascertained the portions of the flood plain which could be negotiated by vehicles and tanks, and located ferry and bridge sites. This arrangement delayed receipt of information at subordinate headquarters but facilitated collection of information, served to avoid duplication of effort, and minimized disclosure of our intentions to the enemy.

8. Bankseat Elevations.

Elevations for the floating Bailey bridge base plates were based on the policy established by the Army Engineer that deck elevations at bankseats should be at the 10-year high water level for the months of March, April, and May. Elevations of the 10-year high water levels at Orsoy and Wesel were established by taking the levels at Cologne, Dusseldorf, and Emmerich for these months, using stage frequency curves from Army Engineer Technical Notes No. 3, and transposing these elevations to Orsoy and Wesel by means of a stage relationship graph. The elevations thus obtained were averaged and the corresponding elevation at each bridge site computed by direct interpolation. Prior to the assault, the 655th Engineer Topographic Battalion set bench marks near each floating Bailey bridge site, using night survey methods.

SECTION III

PLANNING AND PREPARATION

9. Preliminaries.

In October 1944, preparatory to a meeting with other Army Engineers at Headquarters Twelfth Army Group, called for the purpose of discussing and making tentative allocations of available equipment, the following tactical assumptions were made by the Army Engineer for planning purposes with respect to the proposed crossing of the Rhine by Ninth Army:

a. Crossings would be made by two corps, each with two battalions in assault.

b. The following bridges would be constructed:

- (1) Two M2 treadway bridges.
- (2) Two 25-ton ponton bridges, reinforced with pontons.
- (3) Two Class 40 floating Bailey bridges, each with double landing bays to accomodate maximum variations in water level of 25 feet.
- (4) One semipermanent two-way Class 40, one-way Class 70 pile bridge.

c. Seven antimine and antidebris booms would be installed.

At the time the above tentative assumptions were made, it was realized that a crossing on a larger scale would be desirable if availability of equipment permitted. The setting back of the target date permitted procurement of additional equipment from the United States. The crossing was actually effected by one corps with five battalions in assault. Four treadway, two 25-ton ponton, and three floating Bailey bridges were constructed. The semipermanent bridge was constructed as planned. Delay in the operation reduced the threat of floods and permitted substitution of single landing bays for double landing bays on Bailey bridges. The simple cable booms originally contemplated were supplemented by Naval types of netting after their value had been proven by British defenses during the winter against German floating mines and Gamma swimmers on the Waal River at Nijmegen.

Several meetings were held throughout the winter with U. S. Twefth and British Twenty-First Army Groups and other Armies to exchange views on the suitability of various types of equipage as indicated by tests and experiments constantly being conducted.

10. Staff Cooperation.

Supply and planning were continually coordinated with other arms and services throughout the preparatory period. Requirements for signal lamps for beach control, and for radio and telephone nets for crossing operations were coordinated with the Army Signal Officer. The Army Ordnance Officer furnished tank transporters, and technical specialists and materials for waterproofing of engineer tractors utilized in construction of landing stages and approaches. The Army Quatermaster provided 200 cargo trucks for transporting engineer materials. Arrangements were made with the Chemical, Antiaircraft, and Artillery Officers, respectively, for smoke screens, antiaircraft defense, and upstream protection against derelict barges and other floating objects. Through Army G-1, all units in the Army were canvassed for motor boat operators, and 284 non-engineer operators were obtained to augment engineer personnel in the operation of storm and assault boats. A comprehensive camouflage and counter-intelligence plan was worked out by the G-2 and Engineer Sections of Army and Corps. Coordination of traffic plans between Corps and Army for the movement of engineer material was accomplished by Army G-4. Technical engineer considerations as they might affect the tactical plan were constantly furnished to Army G-3 for consideration in the formulation of tactical plans and training policies.

11. Special Equipment.

To determine the effectiveness of numerous items of special equipment, a board was established by Army G-3 on 19 October 1944. The 1141st Engineer Combat Group was designated to conduct tests for the board on the Maas River. Equipment tested included DUKWs, LVT2s, LVT4s (Alligators), M29s and M29Cs (Weasels). These tests demonstrated that all of the items could be used advantageously in the crossing operation, and that DUKWs and LVTs could be used effectively without cableways in the currents anticipated. Estimated cable requirements were reduced and training of engineer units in the installation of cableways was abandoned.

12. Naval Participation.

On 15 November, Naval Detachment 122.5.3, with 24 LCVPs, reported to Ninth Army at Maastricht, Holland. The detachment was augmented on 8 January by additional personnel and by 24 LCM (3)s which had been moved to Maastricht from Antwerp via the Albert Canal. Tests of the craft in river operation, and experiments in various methods of loading for transport, overland movement and launching of the craft were conducted by the 1143d Engineer Combat Group. It was found that LCVPs could be most effectively moved on 25-ton ponton trailers, although movement overland would require selection of routes with minimum overhead clearance of 13 feet 11 inches. Unloading of the craft by backing the trailer into the water, by means of cranes, or by skidding, was found to be feasible. The only praticable means of overland movement of LCMs found was by M25 tank transporters. Required overhead clearance was reduced from 17 feet 6 inches to 15 feet 11 inches by cutting off some of the protective armor of the operator's tower. Upon completion of overland movement the armor was replaced by welding. The only feasible means developed for unloading these craft, due to their weight, bulk and deep draft (48 inches), was the use of two 2-cubic yard cranes, which could lift the craft free of the transporter and lower it into the water. The cooling systems on the engines of all Naval craft were modified with a view to a possible crossing of the Rhine in freezing weather, since their design comtemplated only salt water operation.

13. Raft Propulsion.

Extensive experiments were conducted by the 1143d Engineer Combat Group to find a suitable means of propulsion for ponton rafts. 22-horsepower outboard motors, power utility boats and standard Bailey propulsion units were all found to lack sufficient power for effective control of loaded free rafts in currents equivalent to those expected to be encountered on the Rhine. LCVPs were found to be a satisfactory means of propulsion, but their use in this role would divert them from the ferrying of personnel and light equipment. Through Headquarters Twelfth Army Group, Theater Headquarters, and Naval Detachments, and by contacts with British Naval and Army Units, an effort was made to locate a light craft with shallow draft having sufficient power to propel the ferries. Since no craft meeting these specifications were available, Seamules were adopted for the purpose despite their extreme size, weight and draft. A detachment of the 329th Harbor Craft Company with 40 Seamules was attached to Ninth Army in December, and experiments with the craft were immediately initiated. Hauling of the Seamule by sections on 16-ton or 20-ton flatbed trailers was found to be the easiest method of transport. However, since assembly by trained personnel required a minimum of 12 to 14 hours, it was considered essential to devise a means to haul the craft completely assembled. Tests determined that the Seamules could be hauled on M19 or M25 tank transporters, and unloaded either by backing the trailer into the water until the craft floated or by lifting with two 2-cubic yard cranes. Because the new engines of Seamules often "froze" when first placed in operation, and the drilling of new bolt holes was often necessary to permit assembly of sections, a program of breaking in motors and assembling was initiated. This program was handicapped by a shortage of personnel and suitable cranes, and less than half of the craft had been assembled and tested prior to the operation.

14. NL Pontoons.

It was proposed to use NL pontoon barges to float pile driving rigs for the fixed bridge construction, and for a ferry required to cross loads in excess of Class 40 pending completion of the fixed bridge. On 27 November, the Naval Detachment was augmented by Seabee personnel to instruct and assist Army units in the assembly of NL pontoons. The Naval detachment, and personnel from the 1056th Engineer Port Construction and Repair Group, an Advance Section Communications Zone (ADSEC) unit, were attached to the 1143d Engineer Combat Group and later to the 1146th Engineer Combat Group to assemble NL pontoon barges and steam pile driving rigs for construction of bridges over the Maas River at Maeseyck and Venlo. Methods were perfected on these projects for the Rhine fixed bridge construction.

15. Modification of Treadway Bridging.

Due to a shortage of M2 treadway bridging and the desire to reserve a portion of that available to re-equip treadway bridge companies for operations east of the Rhine, it was necessary to plan on the use of M1 treadway bridge equipage for one of the Rhine bridges.

After experiments by several treadway bridge companies and tests by the 969th Engineer Maintenance Company of various proposed method of modifying the M1 treadway bridge equipage so that it would accommodate the M4 medium tank with track extenders, a modification was adopted which increased the space between the treadways by 8 3/4 inches, and provided a timber treadway on the spacer bars for passage of 1/4-ton vehicles. Two M1 units totaling 2160 feet were so modified prior to the operation.

16. Ponton Bridges.

Originally it had been planned to reinforce the 25-ton ponton bridges with pontons to permit passage of Class 40 loads. Due to a shortage of pontons, and as a result of information regarding difficulties experienced by First Army in maintaining a ponton-reinforced bridge at the Remagen bridgehead because of the damming effect of the pontons, it was decided just prior to the operation to reinforce the bridges with floats, thus providing for Class 36 traffic. During the winter, experiments were conducted on the Maas River with various types of ponton bow adaptors for 25-ton pontons. The tests indicated that the bows were of some value in swift currents and sufficient bow adaptors for the two proposed Rhine bridges were manufactured. Plans were made in conjunction with the Military Pipe Line Service to place a 4-inch gasoline line on one of the 25-ton ponton bridges. Special brackets were designed and fabricated which would carry the line over the water downstream of the downstream end of the pontons in order to reduce fire hazard.

17. Bailey Bridges.

Little experimenting with floating Bailey bridging was necessary, since British manuals provided sufficient data for design. Launching of the 150-foot triple double landing bays, which were necessary to provide the desired accommodation of a 17-foot variation in water level, presented the only serious problem. The difficulties were greater at those sites where fixed Bailey spans supported on piers were required to connect the bridge with the summer dike. The units which were assigned the task of bridge constructiou conducted experiments and training in the launching of these landing bays prior to the operation. The most praticable method devised involved launching the landing bay over a low land pier onto the landing bay pier, followed by jacking up the inshore end and building up the shore pier under it to the required elevation. False bows for Bailey pontoons and wooden hatch covers for the Mk VI pontoons were constructed under commercial contract.

18. Lifebelts.

In order to reduce possible casualties from drowning, more than 25,000 inflation type lifebelts were secured. Emphasis was placed on their use by troops participating in training operations preparatory to the crossing, and a lifebelt was provided for each man who crossed the river in the assault.

19. Assault Craft.

Due to the limited availability of storm boats it was necessary to plan on the use of double M2 assault boats powered by 22-horsepower motors for a portion of the assault craft. Prior to the operation, most of the M2 assault boats which were to be used as bow sections of the double assault boats were equipped with modified bows consisting of simple six-inch splash boards.

20. Anchors.

At the time a winter crossing was under consideration and initial intelligence indicated that currents as great as 15 feet per second could be expected, extensive experiments were made using various types of standard and improvised anchors. British Naval " CQR " anchors were found to be the most effective commercial anchors in the type of sand gravel bottom characterizing the Rhine. Rubble-filled boxes made of Bailey panels were found to be the most effective improvised type. Both types, as well as fluked Bailey panel anchors, heavy barge anchors and standard ponton equipage anchors were provided for the actual operation.

21. Booms.

Tests conducted with various types of booms indicated that standard British Admiralty Netting provided the most effective protection against floating mines and Gamma swimmers. However, because of the length of time required to install this type of boom and the fact that availability limited its use to two of the proposed booms, hasty types of simple log booms with concertina attached, and cable booms supported on floats, were also adopted in planning and as a basis for procurement. XVI Corps adopted a stagger type boom consisting of relatively short sections of cable supported on floats, and anchored independently. These sections were staggered across the river to provide protection in depth. Just prior to the operation, U. S. Naval Grommet type netting became available to provide antisubmarine protection, but little opportunity was available for experiments with this type of net. Throughout the experiments with booms, Army units were assisted by Naval personnel made available through Headquarters Twelfth Army Group.

22. Fixed Bridge.

A proposed design for a fixed pile bridge over the Rhine, on which procurement of bridge material was based, was completed in November and with little modification was followed in the actual construction. Details of the preliminary design and of the final construction are appended as Inclosures 6 and 7. Features of the design were dictated primarily by a desire to conserve tonnage of materials to the greatest extent praticable, and to provide a type of construction within the capabilities of Army Engineer equipment and personnel. Prior to the operation arrangements were made with ADSEC to augment the 1146th Engineer Combat Group with the Dock Sections of the 1053d and 1058th Engineer Port Construction and Repair Groups, thus obtaining the use of their heavy equipment and of their personnel experienced in heavy construction. Because reports indicated that coarse gravel in the bottom might render the driving of timber piling to satisfactory penetration impracticable, 10-inch H-beams were procured in sufficient quantity to permit substitution for up to 30 % of the timber piles.

In accordance with instructions from Supreme Headquarters, Allied Expeditionary Forces (SHAEF), the design provided for a 75-foot navigation span with vertical clearance 2.7 feet above the highest water of record.

23. Route Clearing.

A plan for the clearing of highway routes through the communication center of Wesel was worked out with the Engineer, British Second Army. Routes to be opened were selected by study of aerial photographs. Ninth Army engineers were to start from the river and work on the agreed routes toward British Second Army units, who were to work into town from the east. Arrangements were made for early contact on the ground to decide which of the previously selected routes was the most practicable for immediate opening after the intensive aerial bombardment of the city which was planned for the night of D-1.

24. Final Instructions.

Based on the planning directives issued to XVI Corps and Army Engineer Groups (Inclosures 2 and 4), engineer plans for each phase of the operation were prepared by these units and presented to Army for approval. Necessary modifications and adjustments to bring the plans within the scope of available equipage were effected, and Army Engineer Operations Order Number 207, covering Army phases of the operation was issued on 19 March. Amendments to this order were issued in Operations Orders Nos. 209, 211, and 217 (Inclosure 8). Adjustments in the Corps Engineer's plan were handled informally through discussions and as requisitions for materials and equipment were presented.

25. Preparation.

On 11 March 1945, shortly after XVI Corps was assigned the crossing mission, it initiated an intensive program of road construction and improvement in the vicinity of the crossing sites. Under enemy observation and artillery fire, approach roads up to the winter dikes were widened to permit two-way traffic and were surfaced. It became necessary on 19 March, due to intensification of enemy artillery fire, to confine the work to hours of darkness, using "artificial moonlight". While this activity disclosed contemplated crossing sites to the enemy, it greatly expedited the movement of equipage and the opening of bridges to traffic. The disclosure of crossing sites to the enemy was partially offset by greater activity in road improvement by XIII Corps to the south of the actual crossing area under the counter-intelligence plan.

All possible work which might expedite the crossing was accomplished prior to D-day. Pneumatic floats for the Corps treadway bridges were preinflated and loaded on dump trucks. Approximately 100 dump trucks were loaded with rock for road construction and parked along roads leading to the crossing sites. Seamules, LCMs, and LCVPs were loaded and moved as close to the crossing sites as practicable. LVTs and DUKWs were also moved forward. A carefully controlled traffic plan was placed in effect, including the reservation of a route for exclusive engineer use from the dump containing Corps bridge materials at Lintfort, toward the River. Dual signal communication lines were installed connecting the crossing sites laterally and with bridge parks to the rear. Self-propelled tank destroyer weapons were in the vicinity for immediate emplacement in the winter dikes to protect crossing sites against objects which might be released by the enemy from upstream. Barrage balloons and smoke generating units were available for early protection of the bridge sites.

SECTION IV

TRAINING

26. Army Stream Crossing School.

A school was established in November on the Maas River under supervision of Headquarters 1143d Engineer Combat Group for training engineer units in various phases of the operation. Except for minor interruptions caused by enemy action, floods, and lack of engineer troops who could be spared from operations, the school was operated continuously until March. Courses were conducted in the following:

a. Construction of Bailey bridge, fixed and floating.
b. Seamule operation.
c. Construction and operation of rafts and ferries.
d. LCVP and LCM operation, loading, and unloading.
e. Outboard motor operation.
f. Construction of treadway bridge.
g. Boom installation.

27. SPECIAL TRAINING.

Prior to receipt of steam pile driving rigs for use on the Rhine, arrangements were made for ADSEC units to train operators from Army units in pile driving operations. Selected men were attached to the 332nd Engineer General Service Regiment and to the 1056th Engineer Port Construction and Repair Group, both of which had heavy bridge construction projects underway.

28. CORPS TRAINING.

As soon as the Roer River had been crossed and progress of the attack toward the Rhine permitted, the 30th and 79th Infantry Divisions were withdrawn from the line and undertook intensive training programs on the Maas River in the vicinity of Roermond and Maeseyck. The 1153d and the 1148th Engineer Combat Groups, which were to support the 30th and 79th Infantry Divisions, respectively, in the assault, trained with the divisions. During this period individuals and small units were familiarized with the capabilities and limitations of storm boats, double M2 assault boats, LCMs, LCVPs, LVTs, Seamules, and rafts. Engineer units, when not engaged in assault training with the infantry, received instruction and practice in constructing roads using pierced steel plank and other expedients and in treadway and heavy ponton bridge construction. Training culminated in fullscale dress rehearsal crossings, in both daylight and darkness. At the completion of the training period, all non-engineer outboard motor operators had been trained, as had guides and beachmasters, and all crossing elements had been crossed in craft operated by the engineer personnel who were actually to cross them over the Rhine.

SECTION V

SUPPLY

29. SCOPE.

The supply of engineer equipment and material for the Rhine River crossing was the greatest engineer supply undertaking accomplished by Ninth Army while in the European Theater of Operations. The operation required approximately 17,000 long tons of material and equipment. Requisitioning, movement from Communications Zone depots, and receipt, storage, and movement to bridge parks presented unusual supply and transportation problems.

30. PROCUREMENT.

On 8 November 1944, requisitions were submitted to the Engineer, Communications Zone, through the Engineer, ADSEC, for the estimated equipment and material necessary for the crossing. Requirements as set forth in these requisitions were based on such information regarding characteristics of the Rhine River as was available at that time, and on tentative allocations of critical items of equipage made by the Engineer, Twelfth Army Group. On 2 February 1945, another requisition was presented to the Engineer, Communications Zone, covering equipment and material previously requisitioned but not received. In addition, this requisition covered changes brought about by additional allocations made by the Engineer, Twelfth Army Group, and by the availability of new types of equipment.

From the beginning of receipt of supplies by Army, considerable difficulty was experienced in obtaining a balanced stock. This was particularly true in the case of bridging. Until 1 March 1945, many small component parts of bridges had not been received. In some cases this necessitated the manufacture of these parts, either by civilian concerns or by engineer maintenance companies. There were also many overages, especially in Bailey bridging, which consumed needed storage space and necessitated undue handling.

31. Storage.

Within the open storage area of Engineer Depot No. 4 at Maastricht (See Inclosure 9) a separate stockpile, designated Project "A", was established for the assembly of all Rhine River crossing equipment and material. This project, although the responsibility of the 1961st Engineer Aviation Depot Company, which operated Depot No. 4, was entirely divorced from the depot, with separate records, and was operated by personnel drawn from Engineer Heavy Ponton and Combat Battalions. Since no hardstanding was available within the area, it was necessary to construct roads and railroad spurs and provide for drainage. Extreme difficulty was experienced throughout the period of operation of Project "A" in maintaining the depot facilities, and one engineer combat company was kept almost continuously occupied on this work. Although it was originally intended that no issues be made from this project other than for the Rhine crossing, it was found imperative to authorize large removals for the crossing of the Roer River late in February, and for special river crossing schools. It was also necessary to withdraw M2 treadway bridging from Project "A" to re-equip two treadway bridge companies which were equipped with M1 bridging when assigned to the Army. A detailed inventory of this project was submitted weekly to the Army Engineer Supply Officer. These records were in turn checked each week against requirements and neccessary expediting action was taken with ADSEC and other Communications Zone agencies.

32. Allocations.

Prior to submission of requisitions by XVI Corps and the concerned Army Engineer Combat Groups, a meeting was held in Army Engineer Headquarters for the purpose of discussing requirements and allocating critical items of equipment and material. Considerable difficulty was experienced in the administration and processing of XVI Corps requisitions submitted to the Army Engineer because of the relatively late date upon which Corps was given its mission, making it necessary for the Corps to initiate procurement prior to formulation of its final plans. The necessity for issuing river crossing assault equipment for training purposes simultaneously with that for the actual operation caused further complications. The final allocation of major items to Corps, to Army Engineer Combat Groups, and to Army reserve is indicated in Inclosure 10.

33. Bridge Parks.

Five forward bridge parks were established for Rhine River crossing equipment and material. Locations and connecting routes are indicated on Inclosure 11. One park was operated by each of the four Army engineer combat groups who were responsible for specific projects in the Rhine River crossing, and the fifth was operated by the 37th Engineer Combat Battalion under direct snpervision of the Army Engineer for equipage required by XVI Corps. Movement of necessary equipment and material to the bridge parks from Project "A" was started 16 days prior to D-day, utilizing both truck and rail transportation. Two hundred 2 1/2-ton Quatermaster trucks and approximately seventy 25-ton ponton trailers were employed continuously. Because of the great tonnage involved in timber, hardware, and special equipment for the Wesel fixed bridge, and the protracted period over which this construction was to extend, most of the equipment and material for this project was moved by rail. Special trains with highest possible priorities were utilized. Approximately 65 cranes, varying from 3/8 to 2-cubic yard capacity, were employed in order to complete loading and unloading by the target date. This figure includes a special allocation of 40 cranes procured from ADSEC for the operation. Many of the cranes were subsequently used in bridge construction. Project "A" was outloaded by the 1254th Engineer Combat Battalion. Difficulties encountered during the forward movement included the loss of materials caused by breakdown of trucks or negligence of drivers, the arrival of materials at the wrong bridge parks, and the failure to coordinate movement of cranes from one bridge park to another. In addition, due to difficulties in making proper allocation of unloading facilities, equipment and materials were shipped from Project "A" at a greater rate than they could be handled efficiently at the bridge parks, thus tying up transportation. Extreme difficulty was experienced in moving heavy equipment such as Seamules and LCMs with transportation available to Army. However, by careful selection of routes and traffic control, assembled Seamules and LCMs were successfully moved to the river on tank transporters. Movement of equipment and material alloted to XVI Corps to the river was greatly facilitated by the reservation of the Lintfort-Rheinberg highway for exclusive engineer use under control of the Engineer, XVI Corps.

34. SHORTAGES.

Considerable effort was necessary at the last minute in order to fill shortages of vital items. Due to the inability of Communications Zone to furnish sufficient 1" and 1 1/4" cable, it was necessary to accept 3/4" cable as a substitute. Cable was also procured from various civilian sources in Belgium and the Netherlands, and large quantities of captured cable were utilized. Only six of the eight 25-ton ponton units required to providea 50 % reserve were received in time for the river crossing; since battle losses were light, this shortage proved to be of no signifiance. It was necessary to utilize engineer combat battalions for the production of lumber and piling for the fixed bridge at Wesel, except that 70-foot piling was provided by ADSEC.

35. RESERVES.

Throughout the planning and procurement of Rhine River crossing requirements, reserves were in general set at 50 %. Approximately half of the reserves were moved to the forward bridge parks and the remainder held at Engineer Depot No. 14, Willich (Inclosure 9). The latter was moved from Project "A" to Depot No. 14 by rail just prior to D-day.

36. SALVAGE.

Specific area responsibilities for salvage of river crossing equipment were assigned to engineer units. The army collection point was the Lintfort Bridge Park (Inclosure 11), where crews from the 969th Engineer Maintenance Company and the 37th Engineer Combat Battalion received, sorted, reconditioned and disposed of the salvaged equipment. Recovery of equipment, although given high work priority, was solved by diversion of engineer troops to road and bridge work to support the rapid expansion of the bridgehead.

37. LOSSES.

The following is a list of equipment lost during the Rhine River operation :

LCMs	1
LCVPs	2
Assault Boats	46
22-HP Motors	31
Storm Boats	28
55-HP Motors	18
18-ton M2 Floats, Treadway	11
15-ton M1 Floats, Treadway	6
Ponton Rafts	10
Power Utility Boats, 18 ft.	9
Lifebelts	3216
Log Booms, 1200 ft.	3

These losses approximate 10 % of the total equipment used. Very little bridging was lost due to enemy shelling, most losses being caused by the breaking loose of ferry equipment upstream from the bridges.

SECTION VI

OPERATIONS

CORPS

38. GENERAL.

After essential reconnaissance had been completed and the many details coordinated at conferences, orders covering the crossing were issued by XVI Corps on 18 March. The 79th Infantry Division was to attack on the right and the 30th Infantry Division on the left with boundaries as indicated on Inclosure 3. D-day was set at 24 March and H-hour at 0200. There was to be an artillery preparation from 0100 to 0200 in the 30th Division zone, and from 0200 to 0300 in the 79th Division zone.

The 79th Infantry Division, supported by the 1148th Engineer Combat Group, was scheduled to jump off at 0300, with two battalions assaulting abreast in three waves, with fifteen minute intervals between waves. The first wave, consisting of twenty-eight double M2 assault boats and two storm boats per assaulting battalion, and the second wave of twenty-one storm boats and eleven double M2 assault boats per battalion, would return from the far shore to form the third wave. Maximum use was to be made of ferries (infantry support, treadway and Bailey rafts) in crossing succeeding infantry elements. LCMs, LCVPs, and DUKWs were to move equipment and supplies to the far shore until the bridges were completed, with tanks and TDs being ferried in the LCMs.

The 30th Infantry Division, supported by the 1153d Engineer Combat Group, was scheduled to jump off at 0200, with one battalion from each regiment making the assault and the remaining battalions of each regiment crossing in column. The assault battalions were to cross in four waves, with two minute intervals between waves. The two leading rifle companies would cross in storm boats in the first two waves, and the remainder of the battalion would cross in double M2 assault boats in the last two waves. The second battalion of each regiment would be crossed in LVTs, and in storm and assault boats which had returned. The third battalions would cross in all available storm and assault boats, and in fifteen LVTs and three LCVPs each. Supporting weapons and supplies would be carried by LVTs, LCVPs, LCMs, DUKWs, and ferries. DD tanks would cross under their own power.

Assault zones, crossing areas, and Corps bridge, ferry and boom sites are shown on Inclosure 3.

The divisional engineer battalions were to be crossed with their divisions for engineer work beyond the river. Their only responsibilities in connection with the crossing were the preparation of far shore landing sites and exits for LCVPs, LCMs, LVTs, DUKWs, and DD tanks, until relieved by the Corps engineers.

39. ORGANIZATION.

The XVI Corps Engineer order of battle for the assault crossing was as follows:

a. 79th INFANTRY DIVISION ZONE.

Division Engineers: 304th Engineer Combat Battalion

Direct Support: 1148th Engineer Combat Group, composed of:

- Headquarters and Headquarters Company, 1148th Engineer Combat Group
- 149th Engineer Combat Battalion
- 187th Engineer Combat Battalion
- 1276th Engineer Combat Battalion
- 70th Engineer Light Ponton Company
- 999th Engineer Treadway Bridge Company
- Company D, 747th Tank Battalion
- 556th AAA AW Battalion (Mbl) (Attached for operations only)
- 582d Engineer Dump Truck Company
- Detachment, Naval Unit 122.5.3 (Crews for 9 LCMs and 9 LCVPs)
- Detachment, 329th Harbor Craft Company (Crews for 6 Seamules)

b. 30th INFANTRY DIVISION ZONE.

Division Engineers: 105th Engineer Combat Battalion.

Direct Support: 1153d Engineer Combat Group, composed of:

- Headquarters and Headquarters Company, 1153d Engineer Combat Group
- 258th Engineer Combat Battalion
- 202d Engineer Combat Battalion
- 280th Engineer Combat Battalion
- 234th Engineer Combat Batalion
- 171st Engineer Combat Battalion
- 180th Engineer Heavy Ponton Battalion
- 554th Engineer Heavy Ponton Battalion
- Company E, 17th Armored Engineer Battalion (Treadway Bridge Company, 2d Armored Division)

989th Engineer Treadway Bridge Company
73d Engineer Light Ponton Company
1355th Engineer Dump Truck Company
747th Tank Battalion (less Company D)
Detachment, Naval Unit 122.5.3 (Crews for 9 LCVPs and 9 LCMs)
Detachment, 329th Harbor Craft Company (Crews for 6 Seamules)
553d AAA AW Battalion (Mbl) (Less Battery B) (Attached for operations only)

c. CORPS ENGINEER GENERAL SUPPORT.

1103d Engineer Combat Group, composed of:
Headquarters and Headquarters Company, 1103d Engineer Combat Group
208th Engineer Combat Battalion
625th Engineer Light Equipment Company
633d Engineer Light Equipment Company
3 Platoons, Company C, 84th Engineer Camouflage Battalion
Headquarters U. S. Naval Unit 122.5.3 (less 18 LCM and 18 LCVPcrews)
Detachment C, 329th Harbor Craft Company (less 12 Seamule crews)

40. TASKS.

The following tasks were assigned to the XVI Corps Engineer units engaged in the crossing:

a. 1148th ENGINEER COMBAT GROUP:

(1) The 149th Engineer Combat Battalion: to support the 315th Infantry Regiment, by operating assault and storm boats and ferries.
(2) The 187th Engineer Combat Battalion: to support the 313th Infantry Regiment, by operating assault and storm boats and ferries.
(3) The 1276th Engineer Combat Battalion: to construct Bailey rafts, and launch Seamules, LCMs, and LCVPs for the 149th and 187th Engineer Combat Battalions; to construct an M2 treadway bridge in the vicinity of Milchplatz; and to construct booms upstream of this bridge.
(4) The 70th Engineer Light Ponton Company: to deliver assault equipage to the 149th and 187th Engineer Combat Battalions and to deliver Bailey raft equipage to the 1276th Engineer Combat Battalion.
(5) The 999th Engineer Treadway Bridge Company: to deliver equipment and give technical assistance to the 1276 th Engineer Combat Battalion in construction of the Milchplatz treadway bridge.
(6) Company D, 747th Tank Battalion: to operate LVTs for the 149th and 187th Engineer Combat Battalions.
(7) The 556th AAA AW Battalion: to protect crossing sites from enemy aerial action.
(8) The 582d Engineer Dump Truck Company: to transport engineer supplies and equipment.
(9) Naval Detachment (with nine LCMs and nine LCVPs): to operate their equipment under control of the 149th, 187th, and 1276th Engineer Combat Battalions.
(10) Harbor Craft Detachment (with six Seamules): to operate their equipment under control of 149th, 187th, and 1276th Engineer Combat Battalions.

b. 1153d ENGINEER COMBAT GROUP:

(1) The 258th Engineer Combat Battalion (reinforced by 200 non-engineer motor boat operators): to operate all storm and assault boats for the crossing of the 30th Infantry Division.
(2) The 202d Engineer Combat Battalion (less Company C) (reinforced by Naval and Harbor Craft Detachments): to transport, unload and operate all LCVPs, LCMs, and Seamules and to construct and operate all ferries in the division zone.
(3) The 280th Engineer Combat Battalion: to extend approach roads from the winter dikes to the Rhine, except those leading to the M1 treadway bridge at Mehrum, and to construct landing sites for all craft in the division zone except those in the vicinity of Mehrum.

(4) The 234th Engineer Combat Battalion (with 989th Engineer Treadway Bridge Company attached): to construct the roads to, and the landing sites near the bridge site at Mehrum and to construct the M1 treadway bridge at that location.

(5) The 180th Engineer Heavy Ponton Battalion (with Companies A and B, 554th Engineer Heavy Ponton Battalion, and Companies A and C, 171st Engineer Combat Battalion attached): to construct a float-reinforced 25-ton ponton bridge in the vicinity of Wallach.

(6) Company E, 17th Armored Engineer Battalion, Second Armored Division, (operated as a separate company) (with Company C, 202d Engineer Combat Battalion attached): to construct the M2 treadway bridge in the vicinity of Wallach.

(7) Headquarters and Headquarters Company, 554th Engineer Heavy Ponton Battalion (with Company B, 171st Engineer Combat Battalion attached): to construct required antidebris and antimine booms.

(8) The 171st Engineer Combat Battalion (less Companies A, B, and C): to assist the Corps Engineer by performing liaison and messenger missions.

(9) The 73d Engineer Light Ponton Company: to deliver assault and ferry equipage to the 258th and 202d Engineer Combat Battalions.

(10) The 1355th Engineer Dump Truck Company: to transport bridge equipage for Company E, 17th Armored Engineer Battalion, and road materials for the 280th Engineer Combat Battalion.

(11) The 747th Tank Battalion (less Company D): to operate LVTs.

(12) The 553d AAA AW Battalion (less Battery B): to protect crossing sites from enemy aerial action.

c. 1103d ENGINEER COMBAT GROUP.

The group mission was to construct and maintain all roads eastward to the winter dikes until D-day after which time they would stand by and be prepared to support either or both the 1148th and 1153d Engineer Combat Groups.

41. COMMUNICATIONS.

Due to the distances involved and the need for close coordination, communications were a major problem. More than 200 miles of wire were required to provide necessary service to engineer units alone. The Corps Signal Service ran a direct line from Corps Headquarters to each engineer combat group command post, a line to each point at which pre-loaded trucks of bridging material were to be parked, and a direct line from each engineer group command post to the engineer park at Lintfort. To supplement this net, engineers laid wire to bridge sites and subordinate command posts and to final assembly areas. All wire laid by the 1153d Engineer Combat Group was buried, and as a result the group headquarters was never out of communication with its forward elements.

The XVI Corps Engineer established an engineer command radio net, utilizing the equipment and personnel of a Reconnaissance Platoon of the Cavalry Reconnaissance Squadron, 8th Armored Division. A radio station was located at each bridge site, at each engineer group command post, and at Corps Engineer Headquarters. Each engineer group established its own radio net between its command post, dumps, and final assembly areas.

42. COMMAND.

To maintain control over the widespread operations, and in order to have a responsible representative available to give any required engineer decisions on the spot, the Corps Engineer assigned a Deputy Engineer in the area of each assault division. Each Deputy Corps Engineer was assisted by three officers from the staff of the 171st Engineer Combat Battalion, of which at least one was on duty at the crossing sites at all times. These officers reported all items of interest direct to the Corps Engineer. In addition to the officers operating under the Deputy Corps Engineers, each Engineer group kept one liaison officer on duty at all times at Corps Engineer Headquarters.

43. Equipment.

Major items of equipment (Class II and Class IV) available to Corps for the operation were allocated as follows:

	1153 Engr C Gp (30th Inf Div)	1148 Engr C Gp (79th Inf Div)
Storm boats	160	80
55-HP outboard motors	200	100
M2 assault boats	260	214
22-HP outboard motors	140	100
LVTs	65	35
LCMs	9	9
LCVPs	9	9
Power utility boats	12	12
M2 treadway bridge units	2	2
M1 treadway bridge units	2	0
Seamules	6	6
Class 40 Bailey rafts	12	12
Lifebelts	7,500	5,000
25-ton ponton bridge units	10	0
DD tanks	15	0

44. Roads.

Preparatory road work was performed by the 1103d Engineer Combat Group. The 234th and the 280th Engineer Combat Battalions, which were under operational control of the 1103d Engineer Combat Group until 20 March, and the 208th Engineer Combat Battalion were used in this work. At the time of the assault six power shovels were at three rock stockpiles centrally located to the crossing sites ready to load trucks. Two platoons of the 208th Engineer Combat Battalion stood ready to make emergency road repairs, and two platoons were sent to assist the 234th Engineer Combat Battalion in construction of approaches to the Mehrum treadway bridge.

45. Assault Crossing.

a. Final Preparations.

The hour 2030 on D-1 was set as a deadline for completion of all preparatory work and for the closing of all units into final assembly areas. The period between this time and H-hour was used to check units and equipment, adjust final details, and move to the river. By 0001, D-day, all engineers to engage in the assault crossing, together with the assaulting infantry battalions and storm and assault boats, were assembled behind the dikes on the west bank of the Rhine. The river level was at a 10-year low and the current velocity was estimated at from 5 to 8 feet per second.

DOUBLE ASSAULT AND STORM BOATS COVERED WITH NETS IN FINAL ASSEMBLY AREA BEHIND WINTER DIKE AT WHITE BEACH (D-1)

b. ASSAULT.

The artillery preparation in the 30th Division zone began at 0100. Under cover of the preparation the assaulting engineers and infantry moved up to the water's edge. In this division zone three "beaches" had been selected, as shown on Inclosure 3, over which the three infantry regiments would assault in column of battalions. On both the near and far shores the banks were flat or gently sloping with an abrupt drop of from one to four feet to the water level. The distance from the nearest dike to the water was 500 yards for the southern (Blue) beach, 800 yards for the middle (White) beach, and 150 yards for the northern (Red) beach. At 0200 when the artillery fire was shifted to the 79th Division zone, the assault battalions jumped off, each in four waves with two minute intervals between waves. The outboard motors had been heated previously by Medical Department chemical heat pads and covered with gas protective covers. As a result of this preheating, motors started easily and the departure of the 150 craft in the first wave was nearly simultaneous. The boundaries for this wave were marked by machine guns firing tracer ammunition. After the first wave landed, Signal Corps flashing lights were placed on the far shore to mark the boundaries. Opposition was light and there were few casualties in the assault crossing. The supporting battalions started to cross at 0330 and the bulk of the infantry of the 30th Division had crossed by 0600.

In the 79th Division area more difficulties were experienced due to poorer crossing sites. Long hand carry of assault craft was necessary, and narrower crossings had to be effected because of the predominance of steep banks and local inundated areas on the far shore. At 0305, immediately after the artillery fire had lifted, the first wave crossed with only three boats failing to make a successful crossing, the personnel of which managed to swim ashore. To prevent confusion, the boats of this wave remained on the far shore until the arrival of the next wave. The second wave left at H + 15 minutes and all boats crossed successfully. The boats of the first and second waves then returned to the near shore. The third wave departed at H + 30 minutes, and the crossing was again entirely successful. After the crossing of the first wave, all boundaries were marked by flashing signal lights. Infantry of the remaining battalions of the division were crossed as craft became available. At 0600 an entire infantry regiment had been crossed at the southerly assault site and at 0730 all personnel of the assaulting infantry regiment had been crossed at the northern site. Between 1000 and 1345 the remaining infantry regiment was ferried across, one battalion being crossed by the 149th Engineer Combat Battalion and the other two by the 187th Engineer Combat Battalion.

CAMOUFLAGED DOUBLE ASSAULT AND STORM BOATS IN FINAL ASSEMBLY AREA BEHIND WINTER DIKES AT WHITE BEACH

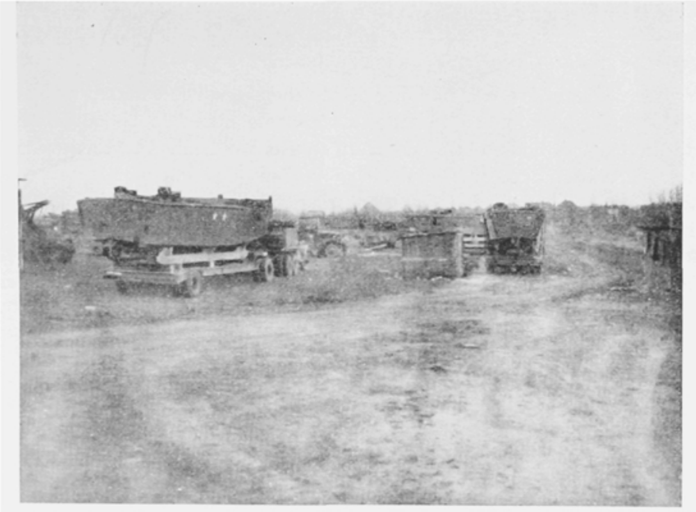
LVTS DISPERSED NEAR WALLACH IN PREPARATION FOR ASSAULT (D-1)

c. Access Roads.

The breaching of the near shore winter dike, which was 12 to 15 feer high throughout the Corps zone, and the construction of roads across the flood plain to the bridge and ferry sites was begun immediately after the assault. In the 30th Division Zone, bulldozers were used to breach the dike and road construction was quickly completed because all available trucks had been previously loaded with a prefabricated road expedient consisting of 2-inch planks attached to Sommerfeld track. In the 79th Division zone, the 187th Engineer Combat Battalion had placed cratering charges in the dikes, which were fired after the crossing of the infantry assault battalions to create breaches for access roads. Bulldozers completed the cuts and traffic passed through at H + 1-1/2 hours. While an entrance existed through the dike in the area of the 149th Engineer Combat Battalion, some dozer work was required to permit its use by wheeled vehicles. A total of 7,000 feet of road on the near shore east of the winter dikes was built and constantly improved by Corps.

Road construction on the far shore presented a greater problem due to a shortage of materials and heavy engineer equipment during early stages of the operation, making it necessary to utilize hand labor methods for the work. Sites had been so selected, however, that the distances from the bank to improved roads were not great and no delays were occasioned by a lack of passable exit roads.

SEAMULE (COMPLETELY ASSEMBLED) LOADED ON M19 TANK TRANSPORTER



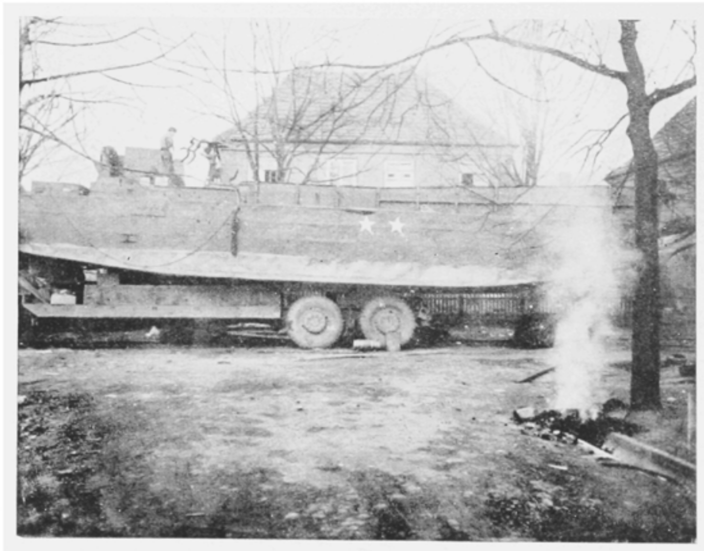
LCVPS LOADED ON FLATBED TRAILERS READY FOR MOVEMENT TO LAUNCHING SITES. (ARMY MOVED THESE CRAFT TO LINTFORT DEPOT ON 25-TON PONTON TRAILERS)

d. Ferrying.

No difficulty was experienced in finding suitable sites for the LVTs. By 0250 they were operating on the three beaches in the 30th Division zone, and by 0400 nine were in operation in the 79th Division zone. They were used extensively throughout D-day, making 107 round trips in the first 24 hours in the 79th Division area alone. They could not make direct crossings since they drifted 300 to 500 yards downstream. However, this did not present any great difficulty as no special entrances or exits were required. DUKWs also gave excellent results as both cargo and personnel carriers and as general utility boats for bridge construction.

LCMs, LCVPs, and Seamules presented many problems both in transportation and launching. In original planning it had been proposed to launch these craft in the Alter Rhine prior to H-hour and float them into the river as they were required. A drop of three feet in the river level exposed obstructions and made it necessary to abandon this plan. It then became necessary to develop suitable launching sites along the river (See Inclosure 3) and to transport the craft forward over the congested road net. In one instance these unwieldy loads caused a traffic jam at 0130 which was not straightened out until 0300.

Preparation of the site in the 30th Division zone, by the removal of wreckage and construction of hardstandings for the heavy equipment, was started with bulldozers and tankdozers at 0250, but enemy fire delayed completion of the work and no craft were launched at this site until 0600.

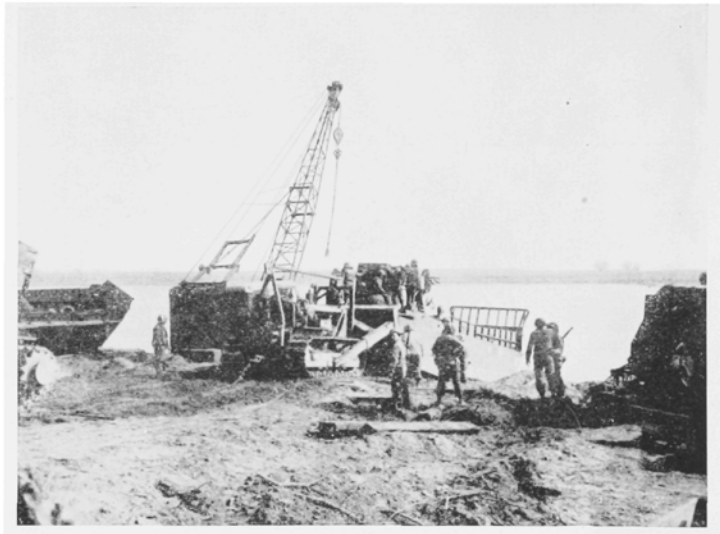


LCM LOADED ON M25 TANK TRANSPORTER

Except for three LCVPs launched at Red Beach which were in use by 0400, all LCMs, LCVPs and Seamules for the 30th Division were launched at the heavy boat launching site just described. At 0500 landing sites had been prepared for the LCMs on the far shore. By 0640 five LCVPs had been launched from the heavy boat launching site, which raised the total to eight LCVPs operating in the division zone; two at Red beach, and three each at White and Blue beaches. The first LCM was launched by the 1153d Engineer Combat Group at 0900. By noon three LCMs were in operation at Blue Beach and six were operating at White Beach. None were used at Red Beach due to the poor road net on the far side.

LCM BEING LAUNCHED BY A CRANE

In the 79th Division area similar difficulties were experienced in launching and operating the heavy Naval craft and Seamules. While there were two German ferry sites available, they were not utilized for launching since they were upstream of the assault crossing sites and exposed to enemy fire. A site served by a suitable road net was developed at the location indicated on Inclosure 3. Moving of LCMs to the launching site was delayed by a fire in a building beside the access road caused by enemy mortar fire. The loaded transporters became mired in the flood plain, and the tractors had to be brought up to pull the trailers to the launching sites. The first LCM was launched at about 0600 but was knocked out by artillery fire at 0800. The remaining LCMs were launched by 1900. The launching of LCVPs began at 0700 and was completed by 1200. The most successful procedure employed in launching LCMs was to back the transporter into the water and float the craft by a combination of sliding and lifting with a 20-ton crawler crane.



DOZER PUSHING LCM INTO WATER AFTER REMOVAL OF TANK TRANSPORTER

The Seamules presented the greatest launching problem in the operation. In the 79th Division zone the transporters loaded with Seamules became bogged down on the flood plain and it was necessary to construct a road to the launching site. This delayed the launching of the first Seamule until 1200 on D + 1. Two more were launched by 1800, and the remaining three on D + 2. They were used for propulsion of ferries, boom installation and patrolling. In the 30th Division zone, only one Seamule was launched. It was in the water at 1740 and was thereafter employed as a patrol boat.

LOADING LCVPS AT BLUE BEACH. LCM OPERATING IN THE RIVER

The LCVPs were by far the most useful of the heavier craft employed. They ferried personnel and light equipment, and were used as power boats for propelling rafts and in the construction of bridges. LCMs were not as valuable as had been expected. They were used to transport tanks, TDs and heavy equipment, but because of their bulk, they were difficult to control in case of motor failure. Delays in launching, and early completion of bridges, detracted from their usefulness.

Only six DD tanks were crossed under their own power. They crossed successfully, but the crossings were so slow due to the relatively high current that the remaining DD tanks were crossed on ferries.

CLOSING DAMAGED END RAMP ON LCM BY MEANS OF ROPES ATTACHED TO M4 TANK

The use of standard ponton ferries was much less than had been anticipated, due to early completion of bridges. By noon of D-day, the 1153d Engineer Combat Group had two Bailey rafts and several treadway rafts

MEDIUM TANK BEING CARRIED TO FAR SHORE ON CLASS 40 BAILEY RAFT. OFFICER WEARING THE WHITE HELMET IS "BEACHMASTER"

in operation, which were utilized to move tanks across the river during daylight hours only until noon of D + 1. Five storm boats, each powered with a 55-horsepower motor, were used successfully to propel each Bailey raft. In the zone of the 79th Division, where completion of the bridge was delayed by enemy fire, greater dependence had to be placed on ferrying. The first infantry support raft constructed was knocked out by artillery fire at 0430, but eight were in operation by noon of D-day. Each was powered by three 22-horsepower outboard motors and, although the crossing speed was quite slow, no unusual difficulties were encountered. A total of five Bailey rafts were constructed and used during the first three days of the operation, the first having been completed at H + 8 hours. Numerous methods of propelling the Bailey rafts were employed. Seamules afforded the best means of propulsion where they could be utilized, but they drew too much water to operate at all sites. Two power utility boats were tried but had insufficient power for proper control. A combination of one LCVP and two power utility boats was found to be satisfactory. Attempts were made to use 55-horsepower outboard motors attached directly to the pontoons, but this proved unsatisfactory because of faulty connecting brackets. Five storm-boats were used to propel a Bailey raft, with fair success. The use of two LCVPs was the most satisfactory method of propulsion employed.

The desirability of locating ferry sites downstream of tactical bridges was recognized and this was done wherever feasible. In several cases, however, the only sites not requiring extensive preparation were imme-

CLASS 40 BAILEY RAFT ANCHORED TO NEAR SHORE AT BLUE BEACH

diately upstream of the tactical bridges. In these instances, each ferry was equipped with two anchors to be cast in the event of power failures. Despite this precaution several bridges were damaged by derelict ferries.

46. Corps Bridges.

a. General.

It was not intended to start construction of bridges until after seizure of bridgeheads which would eliminate observed enemy fire on the sites, because only a 50 % reserve of bridge material was available without utilizing the equipage reserved for re-equiping treadway bridge companies for operations east of the Rhine. However, due to the light enemy resistance encountered, and the availability of smoke for concealment of sites, construction was started while the enemy still had observation on several of the bridge and assembly sites.

b. M2 Treadway Bridge at Milchplatz.

There were two excellent bridge sites for the M2 treadway bridge in the 79th Division zone at existing landing stages, but they were south of the assault sites and exposed to enemy fire. A site was chosen at Milchplatz in the northerly portion of the division zone, at which a minimum of road construction on the far bank was necessary. As had been expected, this southernmost corps bridge drew considerable enemy artillery fire. Construction started at 0800 on D-day and work progressed at a satisfactory rate in spite of light artillery fire. Progress would have been more rapid had more power utility boats or their equivalent been available. At 2330 approximately 720 feet of this bridge had been completed when it was struck by three LCMs. The engine of one LCM had stalled and it was drifting toward the bridge. The other two LCMs attempted to intercept it but all three craft collided with the bridge,breaking it about 240 feet from shore. The replacement of the damaged section was not completed until 1200 on D + 1. All during the day of D + 1 moderate enemy artillery fire fell in the vicinity, although it is not believed that the enemy had direct observation on the bridge. Attempts by Corps Artillery to locate and neutralize the enemy artillery firing on this bridge were unsuccessfull, but all firing ceased while liaison planes were in the air. During the morning, artillery fire knocked out seven floats but construction continued, proceeding very slowly through the afternoon. At 1910 on D + 1, the Corps Engineer issued orders relieving the 1148th Engineer Combat Group of the mission of constructing the bridge and booms in this area, and assigning the mission to the 1103d Engineer Combat Group, which placed the 208th Engineer Combat Battalion on the work. The bridge, 1260 feet in length, was completed at 1645 on D + 2 even though light artillery fire still fell in the area. Shortly after completion artillery fire punctured several additional floats, but these were replaced promptly and the bridge was opened to traffic at 1800, D + 2. The bridge was strafed by an enemy plane at 2240 but the plane was shot down before damage was done.

M2 TREADWAY BRIDGE AT MILCHPLATZ UNDER CONSTRUCTION

c. M1 Treadway Bridge at Mehrum.

Construction of the 1110-foot M1 treadway bridge at Mehrum was started at 0630 on D-day. Work was interrupted at 0700 by enemy artillery fire but was resumed at 0800. During the afternoon artillery fire knocked out 144 feet of the bridge. Construction of the bridge proper was completed at 0615, D + 1 but, inasmuch as it had been constructed by the use of guy cables, it was not opened to traffic until 0830 after anchors had been placed. Construction of approximately 1500 feet of access road across the flood plain had been carried on simultaneously with the bridge construction. The roads was surfaced with crushed rock from a local stockpile and topped with gravel. At 1000 on D + 1 a Seamule drifted against the bridge and caused minor damage. By 1135 another Seamule had succeeded, by use of a tow line and anchor, in relieving the pressure of the first Seamule against the bridge, and it was opened to limited traffic even though there was a pronouced "S" curve in the alignment. By 1700 the Seamule had been pulled away and the bridge was opened to normal traffic.

d. 25-ton Ponton Bridge at Wallach.

Construction of the float reinforced 25-ton ponton bridge at Wallach was started at 0600 on D-day, at which time the hasty approach road which

BAILEY CRIB ANCHOR TO BE USED ON M1 TREADWAY BRIDGE AT MEHRUM

25-TON PONTON BRIDGE CONVOY MOVING TO WALLACH BRIDGE SITE had been completed was being surfaced with crushed rock and gravel. The bridge, approximately 1150 feet in length, was completed at 0100, D+1, but work on the far approach and the placing of treads on the bridge delayed opening to traffic until 0630. Anchors for this bridge had been obtained from barges along the Maas River, and weighed from 200 to 500 pounds. The anchor system was later reinforced by the addition of Bailey crib anchors. Construction of approximately 2400 feet of road on the near bank and 1500 feet on the far bank was required for connection to the existing road net. This work was carried on during the bridge construction, using local gravel and rock previously stockpiled in the vicinity. Due to lack of equipment and unexpectedly early completion of the bridge, considerable improvement of the approach roads had to be made under traffic.

25-TON PONTON BRIDGE AT WALLACH OPENED FOR TRAFFIC

M2 TREADWAY BRIDGE UNDER CONSTRUCTION AT WALLACH. NOTE THE PREFABRICATED ROADWAY

e. M2 TREADWAY BRIDGE AT WALLACH.

The M2 treadway bridge site at Wallach required construction of 2400 feet of road on the near shore and 600 feet on the far shore for connection with the existing road net. Only minor work was necessary to prepare the abutments.

At 0430 on D-day an improvised approach road consisting of Sommer feld track and timber planking covered with crushed rock and gravel had been constructed. Construction of the bridge started at 0630. Until -0815

FAR SHORE APPROACH TO M2 TREADWAY BRIDGE AT WALLACH

all treadway rafts constructed for later incorporation into the bridge were used as ferries. At 0830, as a result of far shore ground reconnaissance, it was found desirable to shift the site of the bridge by 100 yards to take maximum advantage of the existing far shore road net. At 1045 engineer troops crossed the river to start construction of the exit road.

At 1530 this 1150-foot bridge was completed and at 1600 it was opened to traffic. Unfortunately, a Bailey raft loaded with an M4 tank got out of control and floated into the bridge at 1840, causing some damage. The damaged portion was cut away with explosives and by 0200, D + 1, the repairs were completed and the bridge reopened to traffic.

The method of constructing this bridge, while different in a few respects, was in general typical of the manner in which all the treadway bridges were constructed, and is described below in detail. For two days, both the treadway bridge companies and combat companies had been engaged in inflating floats and attaching assembled saddles and saddle beams to them in a woods near Alpon. (See Inclosure 11). All floats were checked for leaks, and the points where the treadways would rest on the saddle beams were marked with luminous paint. The floats were then placed in rows on each side of a road and camouflaged to resemble hedges. Two columns of trucks could load simultaneously between the rows. During the time the floats, saddles and distributing beams were being assembled, twenty dump trucks were fitted with racks for transporting them to the

COMPLETED M2 TREADWAY BRIDGE AT WALLACH

site. These dump trucks were loaded on the afternoon of D–1. On D-day Brockway trucks, as well as the dump trucks, were utilized to transport the treadways and standard loads necessary to complete the bridge. Construction was carried on at three section assembling sites, one of the assembling sites being downstream and two upstream from the bridge. Stocks of spare parts, anchor cable, anchors, rope, and other equipment had been placed at each assembling site.

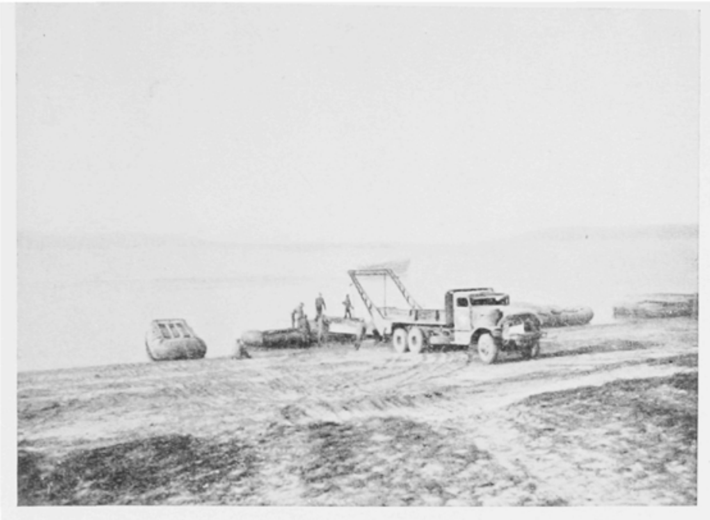
Intermittent artillery fire interfered with construction several times, particularly when the smoke screen over the bridge site lifted and permitted

DAMAGED FLOATS CAUSED BY CLASS 40 BAILEY RAFT DRIFTING INTO M2 TREADWAY BRIDGE AT WALLACH

TRUCKS CARRYING TREADWAY BRIDGING ON APPROACH ROAD TO BRIDGE SITE AT WALLACH. THE ROAD WAS CONSTRUCTED OF SOMMERFELD TRACK COVERED WITH ROCK

enemy observation. One of the assembling sites had to be moved a few hundred yards after enemy artillery had registered on it. Another site had to be moved as the bridge neared completion to avoid interfering with the guy lines.

Since one power utility boat could handle only a two ponton section, this size of raft was used in assembly of the bridge. One 200-pound upstream anchor was used on each float and a 100-pound downstream anchor was used on every second float, making a total of 216 anchors for the bridge.



TREADWAY RAFT UNDER CONSTRUCTION AT WALLACH

47. Defensive Measures.

As passive means of protection against debris, floating mines, barges, explosive filled motor boats, submarines and Gamma swimmers, booms were constructed across the river. Location and construction details are given in ensuing sections of the report.

Antitank guns and self-propelled tank destroyers were dug into the dikes all along the Corps front in position to fire on barges, boats, and submarines. As a secondary mission they were charged with neutralizing enemy small arms fire from the far bank.

An engineer river patrol consisting of two Seamules or other motor propelled craft operated continuously above the bridges. The missions of the patrol were to intercept any derelict barges or other large floating objects and either beach or anchor them, and to prevent Gamma swimmers from reaching the bridges. Each river patrol boat was equipped with two .50 caliber machine guns, two "bazookas", a radio for communication with tank destroyer elements emplaced on the banks, spare anchors, and prefabricated five-pound demolition charges. During early stages of the operation one of the demolition charges from each boat was detonated in the water every five minutes during hours of darkness to discourage attack by Gamma swimmers.

To provide protection against aerial attack three antiaircraft gun battalions, two antiaircraft automatic weapons battalions (self-propelled), and nine antiaircraft automatic weapons battalions (mobile) were disposed throughout the assembly and assault areas. The mobile automatic weapons battalions attached to the 1148th and 1153d Engineer Combat Groups protected bridge convoys in the assembly areas and in movement to the river. Elements of these battalions were ferried across the river early in the operation to provide the maximum possible defense. The antiaircraft battalions were given the secondary mission of firing upon any targets of opportunity floating down the river.

One antiaircraft searchlight battery was disposed so that it could provide night illumination of the crossing sites in addition to the performance of its normal missions. Fifteen CDLs were emplaced to cover the booms. Two chemical smoke generating companies were available to smoke the crossing areas on call. Barrage balloons were utilized for the protection of the bridges against low flying aircraft.

A British naval unit equipped with an underwater listening device was attached to the Army and placed in operation upstream of the Milchplatz bridge. As no enemy water-borne attacks were made in this locality, the effectiveness of the equipment was not recorded.

48. Construction of Booms.

XVI Corps plans contemplated the installation of booms across the river as indicated on Inclosure 3. However, great difficulty was experienced in the construction of the booms, and no boom was completely installed by any Corps unit, with exception of the one at Homberg, which was in place only a few hours before being knocked out, and which had not been reinstalled when the Army Engineer assumed responsibility for the river.

The upstream boom was to be constructed by the 275th Engineer Combat Battalion (Divisional Engineers, 75th Infantry Division) to cover the undemolished spans of the railroad bridge at Homberg. This unit constructed an excellent boom under moderate enemy artillery, small arms, and machine gun fire, in darkness on the morning of D-day, but a direct hit by enemy artillery severed the main cable, releasing the boom. A second boom was constructed, partly from the salvaged portions of the first boom, and was put in position on the night of D-day. On the morning of D + 1, a 20 mm projectile from strafing aircraft hit the main anchor cable and the boom was again broken. On the third attempt to place the boom, during D + 2, the boat pulling it into position had motor trouble and was forced downstream by the current, fouling the boom along the shore.

At Milchplatz, the 1276th Engineer Combat Battalion assembled the log boom on shore but found it impossible to tow it to the far shore. The battalion also had started assembly of the British Admiralty netting on the shore, but had not started on the stagger boom when relieved by the 208th Engineer Combat Battalion on D + 1. The latter battalion succeeded in putting in some elements of the stagger boom, but did not complete it prior to assumption of responsibility for the river by the Army Engineer.

The 1153d Engineer Combat Group did not attempt to place the Wallach booms until D + 1 due to the non-availability of power boats. The log debris boom was constructed on shore and towed across the river but broke before installation was completed. Some sections of the stagger boom were in place when the project was turned over to Army.

49. Relief of Corps Engineer Troops by Army.

At 2330, D + 2, the Corps Engineer issued orders reorganizing the corps engineer units preparatory to releasing responsibility for engineer work on the river to the Army Engineer. The forward engineer combat groups, the 1103d and 1153d, were moved ahead to support the attack east of the Rhine. The 1148th Engineer Combat Group, with those units attached which were to be transferred to Army, assumed maintenance of all roads west of the Rhine River, maintenance of bridges, conduct of salvage operations, and completion of construction of booms.

At 1200, D + 3, the 1148th Engineer Combat Group, with attached units, reverted to the control of Army, and the Army Engineer took over all engineer work west of the east bank of the river.

ARMY

50. General.

Army engineer units constructed three floating Bailey bridges, a 25-ton ponton bridge, a treadway bridge, a Class 70 NL pontoon barge ferry, and necessary booms to supplement corps booms, cleared routes through Wesel, and relieved corps engineers of all responsibility for the river as soon as conditions warranted. Construction at Wesel was initiated as soon as the city had been cleared of the enemy by a British Commando brigade which crossed the river at 2100 on D-1 and attacked the city. Construction at other sites was initiated as the tactical situation and traffic conditions permitted. (See Inclosure 11 for locations).

51. 1142d Engineer Combat Group.

a. Mission.

This group was assigned the tasks of constructing Class 40 Bailey Bridge Number 1 in the vicinity of Mehrum, and of installing such booms required for its protection as were not installed by Corps.

b. Organization.

Composition of the group for the operation was as follows :

- Headquarters and Headquarters Company, 1142d Engineer Combat Group
- 172d Engineer Combat Battalion
- 184th Engineer Combat Battalion
- 278th Engineer Combat Battalion
- 630th Engineer Light Equipment Company
- 1451st Engineer Dump Truck Company
- 1503d Engineer Water Supply Company
- Detachment, 2d Quartermaster Battalion (Mobile) (96 2½ -ton trucks)

Planning, preparation and construction of the bridge was accomplished by the 172d Engineer Combat Battalion with Company B of the 278th Engineer Combat Battalion, the light equipment company, the dump truck company, the water supply company (less two platoons), and the quartermaster detachment, attached. The mission had been assigned on 8 March 1945. Other units of the group engaged in normal engineer work in the group area of responsibility, installed booms and supported the 172d Engineer Combat Battalion.

c. Bridge Design.

The bridge design employed 42-foot floating bays, 150-foot triple double landing bays and one Class 40 sliding bay. Standard Class 70 landing bay piers were required to support the landing bays. A schematic drawing of the completed bridge is appended as Inclosure 12.

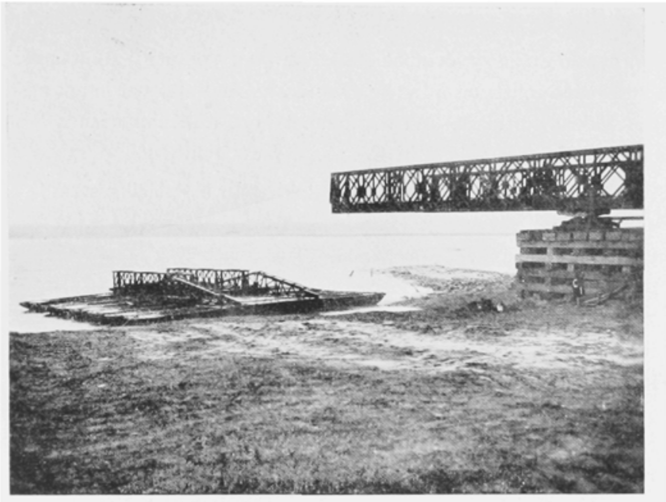
d. Bridge Construction.

At 1500 on D + 1 the Army Engineer instructed the group commander to initiate work; construction of approach roads and hauling of materials began immediately. By careful advance planning the arrival of materials at the site was so scheduled that bridge construction was at no time delayed. Over 600 truck loads of bridge material were hauled to the site without interruption, in accordance with a detailed traffic schedule. Before actual bridge construction began, 96 2-1/2-ton trucks had been loaded with bridging materials ready to be delivered to the bridge site on call.

Construction of approximately 900 feet of approach road over the flood plain was necessary. This was accomplished by grading, hauling in a base course of large stone, and surfacing with river gravel excavated under water by means of a carryall scraper powered by a waterproofed tractor.

The near shore landing bay of the bridge was launched triple single, counterbalanced by double stories and additional panels on the inshore end until the offshore end rested on the landing bay pier which had been brought inshore as far as possible. The landing bay pier was then launched with the aid of two bulldozers to the final position and the inshore end of the landing bay was jacked down onto the bearings. The placing of the second story of the triple truss construction required the use of chord jacks due to the sag in the landing bay and was time consuming and laborious. This method of construction was chosen for the near shore landing bay to permit the earliest possible assembly into the bridge of the floating bays which had already been constructed.

TWO CRANES LOADING A CRIB ANCHOR FOR BAILEY BRIDGE NO. 1 ON TO A BAILEY RAFT



NEAR SHORE LANDING BAY OF BAILEY BRIDGE NO. I BEING LAUNCHED. NOTE LANDING BAY PIER BROUGHT INSHORE ; ALSO TIMBER CRIB PIER ON BANK

The far shore landing bay was launched in the same manner, but the landing bay pier was moved riverward gradually during installation of the second story in such a manner as to control the sag in the landing bay, and no difficulty or delay was encountered in placing of the second story. 12' × 24' timber cribs were used as shore piers to support the landing bays at each end of the bridge.

The far shore pier was selected as the one on which adjusment would be made in the final location of end posts. This pier was located in such a manner that if computed bridge length proved correct the final position of the end post would be on the pier centerline. When actual closure was effected the end post fell at the rear quarterpoint of the pier, necessitating the removal of the top portion of the pier on the river side to provide clearance for the bottom chords and swaybracing of the landing bay.

Anchorage for the bridge was as shown on Inclosure 12. Bailey rubble-filled crib anchors with anchor cables supported by buoys were placed prior to initiation of construction.

Eight outboard motors, mounted on assault boats, two power utility boats and one Seamule were available for use in the bridge construction,

LAUNCHING NEAR SHORE LANDING BAY OF BAILEY BRIDGE NO. I WITH AID OF BULLDOZERS

ADDING SECOND STORY TO NEAR SHORE LANDING BAY, BAILEY BRIDGE NO. 1

but these proved to have insufficient power to do the work required. Two LCMs were obtained from Corps, and were used to attach upstream anchor lines and to tow floating bays into position in the bridge. Bridge construction began at 0800 on D+2 and was completed at 0450 on D+4. The length of the bridge was 1428 feet.

Construction proceeded on a 24-hour basis until the bridge was completed. Full use of lights was made during hours of darkness, with interruption only during periods of enemy aerial activity. Some enemy strafing and shelling occured during the operation but no personnel casualties were suffered.

e. Booms.

The 278th Engineer Combat Battalion (less Company B) was assigned the mission to construct a log boom and an Admiralty net boom upstream of the Mehrum bridges, and a grommet type antisubmarine net on the demolished railroad bridge in the vicinity of Homberg.

Attempts were made to install the log boom by placing a 1-1/4" cable across the river, adding sections of logs on shore, and towing them to their proper place with an LCVP. This method was abandoned due to the difficulty of towing the log sections. The cable was then laid out on the near shore with the upsream end anchored and all logs fastened to it. A cable was run from the downstream end to a winch on a D-7 bulldozer on the far shore which pulled the completed boom across the river. Two heavy anchors and a guy line were used to give intermediate support to the boom. After four days operation it was necessary to rebuild this boom due to J-bolts with which the logs were attached to the cable straightening out, nuts becoming unscrewed from bolts, and chains which joined the logs pulling the J-bolts out of the ends of logs.

The Admiralty net boom was assembled along the near shore and the upstream end attached to a deadman. The downstream end was attached to a winch on a D-7 bulldozer on the far shore by means of a 1-1/4" cable. The bulldozer pulled the net across the river where it was anchored; however, before river anchors could be attached the net broke. A 3/4" cable was attached to the headrope and the net again launched. Anchors were attached and no further difficulties were experienced.

The grommet type antisubmarine boom was attached to the wreckage of the demolished railroad bridge in the vicinity of Homberg without difficulty. No trouble was experienced in towing the net sections to their proper places with a Seamule, or in attaching them to the piers and wreckage of the bridge.

GROMMET TYPE NET BOOM INSTALLED, VICINITY OF HOMBERG

The group also took over the task of completing the log, stagger, and British Admiralty netting booms at Milchplatz which had been started by Corps. The stagger boom was completed without difficulty. It was constructed in 150-foot sections, using logs ten feet long joined together by loops of 1-inch cable. Sections were towed into place by Seamules. Anchorage was provided by fluked Bailey panel anchors attached to 55-gallon drums at the ends of each section. Prior to completion of the log boom, and prior to the start of work on the installation of the British admiralty netting boom, consideration was being given to the construction of a 25-ton ponton bridge in the vicinity of Orsoy. Construction of these booms was delayed pending decision in the matter, with a view to their possible movement upstream to the Orsoy site. (They were eventually installed at Orsoy after the close of the period covered in this report).

52. 1143d Engineer Combat Group.

a. Mission.

This group was assigned the mission to construct Class 40 Bailey Bridge Number 2 and three protective booms across the Rhine River in the vicinity of Wallach.

b. Organization.

Composition of the group was as follows :

Headquarters and Headquarters Company, 1143d Engineer Combat Group

277th Engineer Combat Battalion
336th Engineer Combat Battalion
244th Engineer Combat Battalion
1370th Engineer Dump Truck Company
2733d Engineer Light Equipment Company

c. Bridge Park and Transportation.

The 336th Engineer Combat Battalion operated the group bridge park at Geldern. Heavy equipment and trucks from the 2733d Engineer Light Equipment Company and the 1370th Engineer Dump Truck Company were used to transport the materials to the bridge site. The route utilized carried considerable heavy traffic during the operation, creating a difficult problem in coordination and supply of materials.

d. Bridge Design.

The bridge design was the same as that utilized for Bailey Bridge Number 1, except that 400 feet of double single continuous fixed bridge, supported on timber crib piers at 80-foot intervals, was required between the near bank and the summer dike, and 32-foot instead of 42-foot floating bays were employed. A plan of the bridge is attached as Inclosure 13.

e. Bridge Construction.

The bridge, 1739 feet in length, was constructed by the 277th Engineer Combat Battalion. The fixed span was constructed and launched from the top of the summer dike, using a 20-foot single single launching nose. The landing bays were constructed on the bank and were launched out and down to connect with the transom of the landing bay pier. Because of the weight and length of the landing bay and the one to eight slope of the bank, two D-7 dozers were used to snub the landing bay. The floating bays were assembled and incorporated

WEST SHORE FIXED SPAN UNDER CONSTRUCTION, BAILEY BRIDGE NO. 2

into the bridge using Seamules to propel the rafts into place. Construction began at 0700 on D+2 and the bridge was opened to traffic at 0800 on D+5.

LAUNCHING THE WEST SHORE LANDING BAY, BAILEY BRIDGE NO. 2

Split pins which secure the panel pins in the connecting posts of the floating bays were sheared by the semicircular shoulder next to the panel pin hole with the movement of the bridge under traffic. This was remedied by placing a piece of 2-inch pipe 3/4-inch long over the panel pin to act as a collar.

A FLOATING BAY BEING MOVED INTO PLACE, BAILEY BRIDGE NO. 2

f. ANCHORAGE.

Upstream anchorage consisted of six 1-inch cable guy lines fastened to deadman, twenty-nine 400-pound or heavier anchors 750 feet from the bridge, and forty-two 200-pound anchors 250 feet from the bridge. The 200-pound anchors were cast as the bridge was constructed. After the bridge was completed the heavier anchors were cast from a treadway bridge 750 feet upstream. This eliminated the necessity of using large craft immediately upstream from the bridge.

g. BOOMS.

Due to the rapid clearing of the enemy from the far shore, boom requirements were reduced and the 1143d Engineer Combat Group was required to complete and maintain only two booms, rather than the three originally contemplated. The 277th Engineer Combat Battalion accomplished this work in additon to the bridge construction. The stagger boom started by Corps downstream of the Wallach bridges was completed, and a log boom was installed upstream. The log boom was placed by assembly along the shore, securing the upstream end to a near shore holdfast, and pulling the downstream end to a holdfast by means of a winch on a D-7 dozer on the far shore. 1-1/4-inch wire rope, with logs fastened to it by J-bolts, was used in the boom.

h. MISCELLANEOUS.

The 244th Engineer Combat Battalion, and other units as they completed assigned tasks, engaged in normal engineer work in the group area of responsibility and supported the 277th Engineer Combat Battalion.

53. 1117th ENGINEER COMBAT GROUP.

a. MISSION.

This group was assigned the following missions at Wesel :

(1) To construct a Class 40 M2 floating treadway bridge

(2) To construct a Class 36 float reinforced 25-ton ponton bridge

(3) To construct Class 40 Bailey Bridge No. 3

(4) To construct and operate a Class 70 NL pontoon (Rhino) ferry

(5) To open the main traffic routes through the city of Wesel as shown on Inclosure 11

(6) To install a total of six booms

(Relative locations are shown on Inclosure 11).

b. Organization.

The composition of the 1117th Engineer Combat Group for the operation was as follows :

- Headquarters and Headquarters Company, 1117th Engineer Combat Group
- 167th Engineer Combat Battalion
- 248th Engineer Combat Battalion
- 1253d Engineer Combat Battalion
- 1698th Engineer Combat Battalion
- 551st Engineer Heavy Ponton Battalion
- 536th Engineer Light Ponton Company
- 574th Engineer Light Ponton Company
- 1000th Engineer Treadway Bridge Company
- 2705th Engineer Dump Truck Company

c. Access Roads.

The 1253d Engineer Combat Battalion (less Companies B and C), with the 2705th Engineer Dump Truck Company attached, was assigned the task of constructing and maintaining access roads to the bridge sites. Practically no road construction was required on the far shore as a city street existed along the top of the river bank. On the near shore, however, approximately 3300 lineal feet of road had to be constructed over the soft flood plain. Immediately upon receipt of instructions from the Army Engineer at 0915 on D + 1 to proceed with construction, the planned road net was swept for mines and an expedient road constructed. The roads consisted of a layer of Hessian mat, 4-foot treads of chespaling, a layer of Sommerfeld track, a layer of pierced steel plank and a covering layer of 4 to 6 inches of crushed rock. The roads held up well under traffic, but became extremely rough and required constant surface maintenance. Inasmuch as the silty flood plain did not become inundated during the life of the bridges, no definite conclusions can be drawn as to the sufficiency of this type expedient on a saturated flood plain.

LAYING EXPEDIENT ROAD APPROACH TO THE WESEL BRIDGES

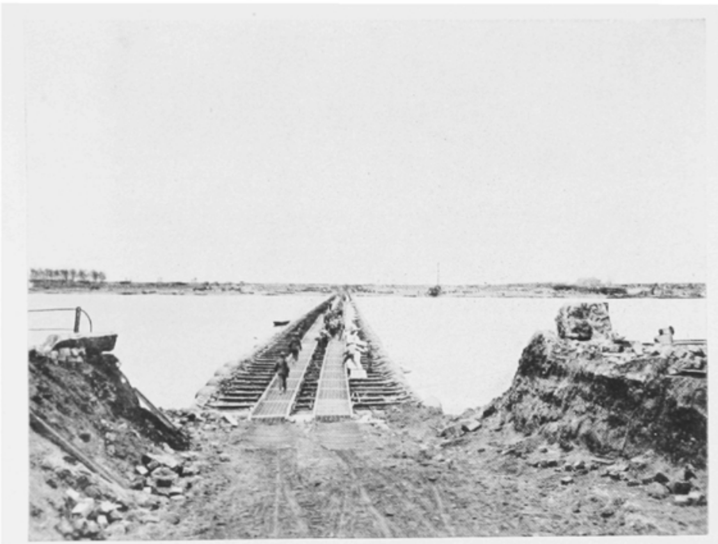
d. Supply and Transportation.

Company C of the 1698th Engineer Combat Battalion operated the group bridge park.

Organic transportation of units within the group allocated by group headquarters for hauling materials. Early work was greatly expedited by loading the material on trucks prior to D-day, and infiltrating bridge loads to the sites from a forward truck assembly area as needed. Later phases of the construction were delayed by lack of materials due to traffic jams on the Venlo – Wesel highway following completion of the treadway bridge.

e. M2 TREADWAY BRIDGE AND CLASS 70 FERRY.

The 248th Engineer Combat Battalion, with the 1000th Engineer Treadway Bridge Company attached, was given the mission of constructing the Class 40 M2 treadway bridge and the Class 70 NL pontoon ferry.



FAR SHORE APPROACH, TREADWAY BRIDGE AT WESEL

TREADWAY BRIDGE AT WESEL LOOKING FROM CENTER TOWARD THE WEST SHORE

The bridge was built by rafts, using four assembly sites where two ponton section rafts were constructed. Assembly sites were leveled with a D-7 dozer and surfaced with an expedient road mat to support the Brockway bridge trucks. The bridge was constructed from the far shore in order to keep the restricted area on the near shore free for assembly sites. Considerable blasting was required to breach the concrete retaining wall along the far shore bank to provide an approach. Enemy action in the town of Wesel delayed completion of this work and it was necessary to begin constructing the bridge upstream of the final site. Approximately 180 feet of bridge was assembled in this manner and was moved downstream into position after the approach had been completed.

Power utility boats and LCVPs were used for casting anchors and for propelling rafts into position for incorporation into the bridge. Enemy action hindered bridge construction somewhat and three casualties were suffered. Construction began at 1505 on D+1 and the first traffic crossed at 0405 on D+2. The bridge was 1284 feet long, composed of 103 floating spans and 36 feet of trestle approach.

The Class 70 ferry was a standard 100-ton 4 × 12 NL ("Rhino") barge as described in Bureau of Yards and Docks Pamphlet 322.3257, Pontoon Gear Manual. A ferry site downstream from the demolished railroad bridge was chosen to prevent possible damage to the tactical bridges in the event that the ferry got out of control. The NL pontoons were assembled

FOUR BOAT — THREE BAY PART UNDER CONSTRUCTION FOR 25-TON PONTON BRIDGE, WESEL

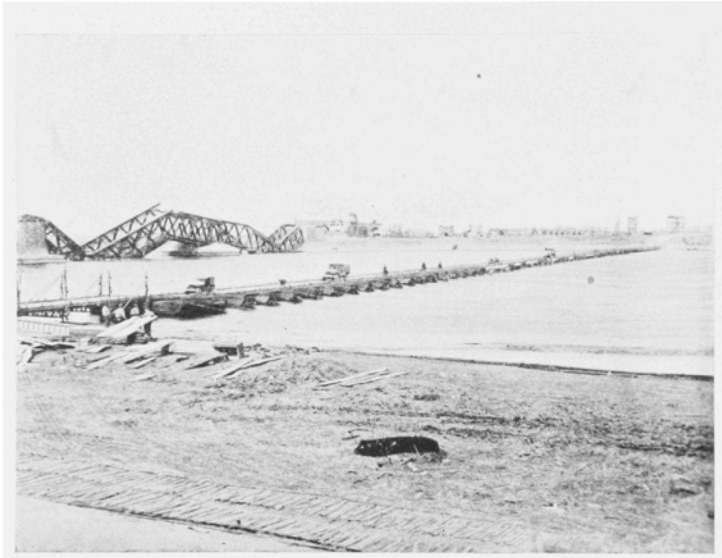
WAITING FOR A PART TO BE BROUGHT INTO POSITION FOR INCORPORATION INTO THE WESEL 25-TON PONTON BRIDGE

in 1 × 12 strings prior to the operation, hauled to the site on 40-foot Air Corps trailers, unloaded by two 2-cubic yard cranes, and assembled by Naval personnel into a 4 × 12 barge. Landing stages were constructed by driving piling and laying steel stringers and decking in a manner similar to that used in fixed bridge construction. A hinged ramp which could be raised or lowered onto the deck of the landed ferry was erected on each landing stage, greatly facilitating loading and unloading of vehicles. Two LCMs were used for propulsion and a Seamule was kept standing by to furnish extra power when landing the ferry. No major difficulties were experienced in constructing the barge, but the task was time consuming and the ferry was not placed in full operation until D+6.

PIERCED PLANK USED FOR TREADS

f. 25-Ton Ponton Bridge.

The 551st Engineer Heavy Ponton Battalion with Companies B and C of the 1253d Engineer Combat Battalion, Company A of the 1698th Engineer Combat Battalion, the 536th Engineer Light Ponton Company, and one platoon of the 574th Engineer Light Ponton Company attached, was assigned the mission of constructing the heavy ponton bridge and installing protective booms. The bridge was a standard Class 36, 25-ton ponton bridge (pneumatic float reinforced), consisting of 90 feet of fixed trestle spans and 1140 feet of floating bridge. The construction was greatly facilitated by special prior loading of the bridge trucks. The pontons were turned upright on the semitrailers. Pneumatic floats were inflated and assembled with saddles and loaded on top of the pontons. A schedule was set up for the dispatch of trucks from a forward assembly area as needed. The bridge was built by parts at five sites, a near shore installation site, a near shore and far shore hingespan raft site, and two 4 boat – 3 bay part assembly sites. The bridge assembly crew spent considerable time waiting for the bridge parts to be completed and brought into place. A larger part assembly crew, or the use of another part assembly site, would have relieved this situation. Suitable lumber for treads was not available so pierced steel planking was used. Ponton bow adaptors were used on upstream bows of all pontons. The bridge was started at 2000 on D + 1 and completed at 1850 on D + 2.



COMPLETED 25-TON BRIDGE CARRYING TRAFFIC AT WESEL