

broad-gauge railway, supplying the Corps front.

(b) Light railways (25-inch gauge) using motor haulage power, from the railhead. There should be one per Division, and one per Corps for the heavy artillery.

(c) Tramways, same gauge as light railway, man or mule power, arranged to enter the danger zone in advance of light railway, which in the advance, will follow the tram tracks. The trams lead across the rear of Brigade area, and may go as far forward as the support trench. Usually, however, they do not extend beyond the reserve, and may run through the communication trenches.

(d) Roads, one for each Division, for horsed transport, lorries and motor cars, lead from the broad-gauge railhead.

(e) Cross country tracks, trench boarded wherever necessary for troops, are provided in order to relieve the communication trenches. Overland tracks are provided for pack transport as well as supply and ammunition wagons, in order to relieve the roads in wet weather.

(f) Subways, wherever possible, are carried forward even beyond the fire trench. These are not opened at the forward ends until moment of assault.

When troops have to advance over ground much pitted with shell craters, the rapid construction of track is one of great difficulty. In creating the new lines of communication, the order of importance, as regards priority, is,—First, the double duckboard track for man carriage of ammunition, water and rations. Second, the tram track, which later is developed into light railway. Third, the track for animal transport. Fourth, a plank or other roadway, and finally the standard gauge railway. All but the last are constructed by the engineers and pioneers, with infantry assistance.

Forward communication trenches may not be needed, in any case at first, if the attack is to be pushed to a considerable depth.

There will be also special roads prepared for the artillery, as well as necessary bridges over trenches.

Engineer Dumps.

Into dumps are gathered all the Engineer tools and supplies, brought as far forward as is consistent with safety. First is the Corps dump, on the broad gauge railway. In addition to usual engineer stores, there should be available, here, road repair materials, artillery shelters, and camouflage materials (netting, etc.), for batteries in the open. Workshops

should be provided when possible, and the light railways and roads should connect here, for convenient loading for transport.

In the Divisional area are the following dumps, of stores and tools normally required, apart from road material.

(a) Main Divisional dump, located when possible on light railway, by which as well as by road, it is fed from Corps dump.

(b) Advanced Divisional dump, usually on a road where transport can deliver by day, and where materials can be loaded and sent forward by night. Should also be on the light railway system.

The purpose of this dump is to get materials to a more forward position than one which would be safe for a main Divisional dump-site.

(c) Brigade dumps, or Field Company dumps, are situated as far forward as horsed transport can go at night, or at the light railway railhead, and should be adjacent to an existing or projected tramway. Though always required in stationary warfare, Brigade dumps are not always necessary in offensive operations, as Field Companies and Battalions can conveniently draw from one or the other of the Divisional dumps and take the stores direct to the special trench dumps.

(d) Special Trench dumps are formed for offensive operations, and are not drawn upon until the offensive begins. They contain the stores and tools for the projected communications forward, and are in charge of the Infantry. All other dumps are in charge of the Engineers.

In some cases Corps dumps are well advanced, and in these forward Corps dumps, will be stocked only the ordinary stores, such as sandbags, barbed and plain wire, wooden pickets, long and short screw posts, pit props and fascines, planks, etc., for making roads. In such cases the Corps dump rearward, carries only special stores.

The dumps are stocked early, for what may easily be done in the early stages, becomes difficult when the roads are congested with artillery ammunition and other stores going forward, and while the area is being heavily shelled.

Precautions Against Shell Fire.

Dumps are placed clear of all the usual "shell traps" which regularly draw enemy fire, such as cross roads, churches, outlying farms, barns, etc. The stores, too, are divided into several sub-dumps, sufficiently far from each other so that one shell will not destroy more

than one dump. The stores are also separated into duplicate lots so that if one sub-dump is destroyed another will remain.

Stores In Readiness.

As it will certainly be necessary sooner or later to use man transport, stores are made up into "man-loads" as far as possible. A certain amount of stores is also kept packed upon such wagons as are available, or else ready to load upon pack saddle.

Taking Forward.

As soon as the advance has taken place and engineer work becomes possible, carrying parties of infantry, (and when possible pack transport), take the stores forward from the most advanced dumps to the places where they are to be used, and scattered along the lines of projected railways, trenches, roads, etc. The main difficulty is carriage. There are seldom enough men available to take them from Brigade dumps, for it must be remembered that carrying under battle conditions is very slow. Thus, although the order "Send up enough" is a good rule, yet in actual practice the essentials must be selected and sent forward first.

Consolidating The New Ground.

The first work in the advance is the consolidation of the enemy territory. The usual work in the first instance is the making of—

(a) An observation or outpost line,—a line of craters connected together, or an enemy trench reversed. As, however, the latter are under exact enemy range, new trenches (some distance in front) are better.

(b) A support line, which may be the captured and organized enemy trench, or else a new trench in front of it. This will usually be the first trench prepared, the outposts being shell craters. As first, however, the support may be only a series of small posts.

(c) A line of strong points still further in rear, so as to give depth to the system.

(d) Opening up, or clearing out of communication trenches; digging forward to, and backward from, the captured line.

(a) and (b) constitute the work which occupies the infantry aided by engineer assistance. Assistance by Field Companies under C.R.E. orders, or by parties of pioneers and infantry working under the same supervision is also desirable.

Other tasks where engineers and pioneers are required at this stage,

and the order of their importance, are—

(a) Bridging enemy trenches, as well as our jumping off trench, in order to permit the field artillery to go forward. Light wooden bridges are used, or else the trenches are ramped and filled. The artillery may arrange this themselves.

(b) Tracks for infantry, pack transport, etc., with shelter trenches at intervals for protection during shelling.

(c) Making and affixing sign boards and direction marks in captured trenches.

(d) Formation of engineer dumps, observing due precaution, and utilization of any enemy engineer dumps.

(e) Repairing and improving dugouts for use as command posts. Tunnelling companies, if available, should be used for this work.

(g) Maintenance parties to keep trenches free from obstructions caused by shell fire.

Later on, when the line is fairly established, small steel shelters may be placed in the outpost line, and dugouts and observation posts in the support line.

The Corps normally deals with the following work, although the Divisional engineers may be at times called upon for it—

(a) Extension of tramway system, for bringing up stores and for the evacuation of wounded.

(b) Repair of roads leading to the front for sending up heavy guns and mechanical transport.

(c) Extension of piped water supply.

(d) Preparation of second positions, etc.

Of course, this is not all the work required of the engineers, but only that part which is most important in the advance.

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