LINES OF COMMUNICATION

Lines of communication (LOC) are all the routes (land, water, and air) that connect an operating military force with a base of operations and along which supplies and reinforcements move. An LOC map is especially important to transportation corps and logistics personnel. It is also important for planning the interruption of enemy supplies. This map differs from the CCM map in that it shows routes over which supplies rather than deployed forces will move, so it depends more heavily on existing roads, railroads, and airfields.

**Roads**

**Step 1.** Study the requirements from corps and division before preparing specifications for synthesizing LOC roads.

**Step 2.** Examine the base map and become familiar with the LOC study area road net.

**Step 3.** Examine the transportation factor overlay, to select the major and secondary roads, the on-route fords, ferries, tunnels, galleries, and snowsheds for the LOC study. Identify major road categories to be used in the LOC study, such as all-weather hard surface and fair-weather loose surface.

**Step 4.** Examine the data tables to select the essential data elements listed on Table 1. See [Figure 5-1].

**Step 5.** Obtain aerial photos for the area of interest to verify and update information.
**Step 6.** Prepare an informal layup from alternate photos. Examine the road network, correlating the roads selected for the LOC study with the photos. Also examine the tunnels, galleries, snowsheds, ferries, and on-route fords.
Step 7. Stereoscopically examine the selected roads, tunnels, galleries, snowsheds, ferries and on-route fords to ensure that there are no changes or errors in the data-base parameter information. Revise and record any changes.

Step 8. Recheck all gathered information on roads, tunnels, galleries, snowsheds, ferries, and on-route fords to ensure that the selected roads meet with the user’s request.

Step 9. Compile all pertinent data and draft it onto a clean overlay. Make sure the data pertains to the LOC, since not all data on factor overlays is necessary for an LOC overlay. See Figure 5-2.

See Figure 5-2 for typical roads and related structures found on a factor overlay. The data is derived from an analysis of maps, literature, and photos, and the details for the data elements are recorded on a roads factor overlay data table, which shows more than you need for a study. After examining the map area and identifying the LOC relevant data elements, check the available aerial photography of the area.

**Bridges and Overpasses**

Step 1. Study the requirements from corps and division before preparing specifications for synthesizing the LOC.
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**Step 2.** Examine the base topographic map to become familiar with the LOC study area.

**Step 3.** Examine the bridge section of the transportation factor overlay to select pertinent information.

**Step 4.** Examine the bridge data table to select the data elements listed on Table 1 for each relevant LOC.

**Step 5.** Obtain aerial photos for the area of interest to verify and update information.

**Step 6.** Prepare an informal layup from alternate photos. Examine the road network and locate the bridges selected for the LOC study area.

**Step 7.** Stereoscopically examine the selected bridges for any changes or errors in data-base parameter information. Revise and record any changes.

**Step 8.** Recheck all gathered bridge information to ensure the selected bridges meet with the user’s request. You must show all bridges greater than or equal to 18 meters.

**Step 9.** Record only the pertinent information on the draft LOC. See Figure 5-2.

**Railroads**

**Step 1.** Study requirements from corps and division before preparing specifications for synthesizing the LOC railroads.

**Step 2.** Examine the base topographic map to become familiar with LOC study area railroads.

**Step 3.** Examine the transportation factor overlay to select LOC areas of interest.

**Step 4.** Examine the railroad data table to select the essential data element information as listed in Figure 5-3.

**Step 5.** Obtain aerial photos for the area of interest to verify and update information.

**Step 6.** Prepare an informal layup from alternate photos. Examine the area railroads and locate the segments selected for the LOC study area.

**Step 7.** Stereoscopically examine the selected railroads for any changes or errors in data-base parameter information and make necessary revisions.

**Step 8.** Recheck all gathered information to ensure that selected railroads meet with the user’s request.

**Step 9.** Outline all information on the draft overlay.

5-4
<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>FACTOR</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Slope</td>
<td>&gt;30%</td>
</tr>
<tr>
<td></td>
<td>Canopy closure</td>
<td>&gt;50%*</td>
</tr>
<tr>
<td></td>
<td>C3 C4 D3</td>
<td>D4 E3 E4</td>
</tr>
<tr>
<td></td>
<td>Roof Coverage**</td>
<td>&gt;40%</td>
</tr>
<tr>
<td></td>
<td>Slope</td>
<td>10-30%</td>
</tr>
<tr>
<td>Poor</td>
<td>Canopy closure</td>
<td>&lt;50%</td>
</tr>
<tr>
<td></td>
<td>C1 C2 D1</td>
<td>D2 E1 E2</td>
</tr>
<tr>
<td></td>
<td>Roof Coverage**</td>
<td>20-40</td>
</tr>
<tr>
<td></td>
<td>Slope</td>
<td>&lt;10%</td>
</tr>
<tr>
<td></td>
<td>Non-forested</td>
<td>A1 B G</td>
</tr>
<tr>
<td></td>
<td>Roof coverage**</td>
<td>&lt;20%</td>
</tr>
</tbody>
</table>

* Or stem spacing 5m
** If evaluated

Note: Criteria may not be applicable to your unit.

**Figure 5-3.** Cover from flat trajectory weapons

**Airfields**

**Step 1.** Study requirements from corps and division before preparing specifications for synthesizing the LOC airfields.

**Step 2.** Examine the base topographic map to become familiar with the LOC study area.

**Step 3.** Examine the transportation factor overlay to select pertinent areas of interest.

**Step 4.** Examine the airfield data table to select the essential data elements information as listed in Figure 5-3.

**Step 5.** Obtain aerial photos for the area of interest to verify and update information.

**Step 6.** Prepare an informal layup from alternate photos. Examine the airfields and locate the segments selected for the LOC study area.

**Step 7.** Stereoscopically examine the selected airfields for any changes or errors in data-base parameters information, and make necessary revisions.

**Step 8.** Recheck all gathered information on airfields to ensure that selected airfields meet the user's request.

**Step 9.** Outline all information on the draft LOC overlay.

**Remaining Factor Overlays**

**Step 1.** Check the soils factor overlay to what effect soil conditions will have on unsurfaced routes. Consider the probable weather to see if it might cause
surfaces to be muddy, frozen, dry, or dusty and to see if the expected condition will be favorable or unfavorable to movement along the roads.

**Step 2.** Check the vegetation factor overlay and mark any areas where vegetation will conceal the mute. Show the percent of canopy closure at the given time of year.

**Step 3.** Check the drainage factor overlay to locate and mark areas where flooding might impede movement, to see if any rivers must be bridged or forded, and to see what trussing facilities exist. Figure 5-4 shows steps to be followed in the synthesis process from existing factor overlays and data tables.

**COVER FROM FLAT TRAJECTORY WEAPON**

Cover, or protection from enemy fire, is a vital part of military operations. Examples are rocks, river banks, vegetation, quarries, walls, and buildings.

**Step 1.** Study requirements from the requester.

**Step 2.** Obtain source materials, including the base topographic map, photography, and vegetation and slope-factor overlays.
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Step 3. Review source materials.

Step 4. Determine what parameters each category falls into (good, fair, or poor). To construct a cover overlay, you must consider slope, vegetation, and, roof coverage (if it is evaluated).

Step 5. Draft the cover overlay.

CONCEALMENT FROM AERIAL DETECTION

Concealment is protection from observation. This overlay is important for judging where the enemy might be located. It is especially important in areas where guerrilla forces might be operating, because it helps the commander predict attacks. Concealment may be provided by woods, underbrush, snowdrifts, tall grass, cultivated vegetation, roof coverage, or any other feature that denies observation.

Step 1. Study the requirements and determine if concealment is for the summer (wet) season or for the winter (dry) season.

Step 2. Obtain the base map, aerial photography, and the proper seasonal vegetation factor overlay.

Step 3. Review the vegetation factor overlay with the base map and aerial photography to ensure that all vegetation categories are shown correctly. A deciduous forest with 25 to 50 percent canopy closure is a D2 vegetation code on the data-base factor overlay and is a fair area for concealment. A mixed forest with 0 to 25 percent canopy closure is an E1 vegetation code on the data-base factor overlay and is a poor area for concealment. The type of vegetation and the canopy closure are the two main factors you should check on the vegetation factor overlay.

Step 4. If evaluated, roof coverage is also used as protection from observation. You will probably look at this more in winter than summer because of the lack of vegetation during winter. Use Figure 5-5 to determine which parameter each vegetation category and roof coverage will fall into.

Step 5. Draft a concealment overlay.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>ROOF COVERAGE</th>
<th>VEGETATION CATEGORY</th>
<th>PERCENT CHANCE OF DETECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent</td>
<td>Summer</td>
<td>Winter</td>
</tr>
<tr>
<td>Best</td>
<td>&gt;40%</td>
<td>C4, D4, E4, F4, I4</td>
<td>C4</td>
</tr>
<tr>
<td>Good</td>
<td>20-40</td>
<td>C3, D3, E3, F3, I3</td>
<td>C3</td>
</tr>
<tr>
<td>Fair</td>
<td>&lt;20</td>
<td>B2, C2, E2, F2, I2, M</td>
<td>B2, C2, E3, E4</td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td>A1, B1, C1, D1, E1, F1, G1, G2, H, I2, J, K, L, N, X</td>
<td>A1, B1, C1, E1, F1, G1, G2, H, I2, J, K, L, N, X</td>
</tr>
</tbody>
</table>

* Or stem spacing 5m

Figure 5-5. Concealment from aerial detection summer or wet season