CHAPTER 5

TIES

5-1. General.

a. The functions of a tie are to:

(1) Maintain gage.

(2) Maintain surface.

(3) Maintain alinement.

(4) Distribute the load from the rail to the ballast and subgrade.

The inability of a tie to adequately perform any of the above functions constitutes a defective tie.

b. Tie selection and treatment.

(1) *Tie selection.* New ties selected for use in the maintenance of Army track shall meet the requirements specified in the AREA *Manual For Railway Engineering*, chapter 8, part 1 for 6-inch grade and 7-inch grade ties. The preferred species for ties are the following hardwoods: Red Oak, White Oak, Hickory, Ash, Beech, and Gum. Where softwoods are used, the Pine and Fir species are preferred.

(2) *Treatment.* Ties shall be pressure treated in accordance with the most current version of American Wood-Preserver's Association (AWPA) Standard C6. As a general recommendation, the preferred preservative for ties is a creosote-coal tar solution (60/40) as specified in AWPA Standard P2, "Standard for Creosote and Creosote Solutions". For ties used West of the Mississippi River where attack of the wood by organisms such as fungi and termites is generally not as severe, a creosote-petroleum solution (50/50) as specified in AWPA Standard P3, "Standard for Creosote-Petroleum Oil Solution" may be used.

(3) *Switch ties.* It is recommended that switch ties be hardwood selected from the list of preferred species given in paragraph 5-l*b*(1).

c. installation. Ties shall be installed perpendicular to the rails and properly tamped and spiked. Ties shall be installed with the top of the tie (or the tie plate) in full contact with the base of the rail and the bottom of the tie near the rail seat in full contact with the ballast.

5-2. Identification of defective ties.

a. Defective ties. A tie is defective if it is:

(1) Broken through.

(2) Split or otherwise impaired to the extent that it will not hold spikes or other rail fasteners.

(3) So deteriorated that the tie plate can move laterally more than ½ (0.5) inch relative to the crosstie.

(4) Cut by the tie plate more than 2 (2.00) inches.

(5) Cut by wheel flanges, dragging equipment, fire, etc., to a depth of more than 2 (2.00) inches within 12 inches of the base of the rail, frog, or load-bearing area.

(6) Rotted, hollow, or generally deteriorated to a point where a substantial amount of the material is decayed or missing. These defects are shown in figure 5-1.

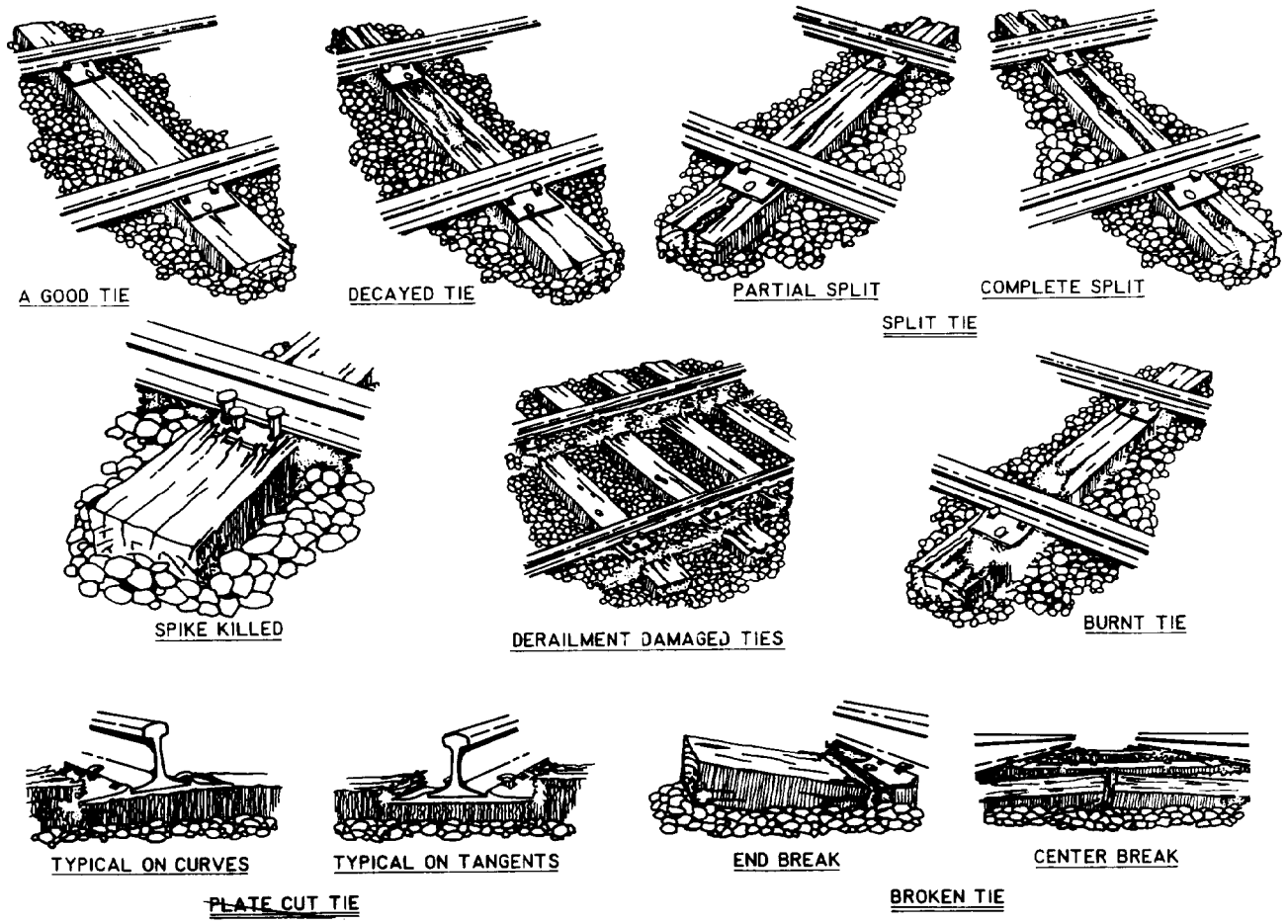

Figure 5-1. Examples of good and defective ties.

b. Improper tie support (down or hanging ties). Ties that do not support both rails are considered defective. If these down ties are not materially defective (see para 5-2*a*), they shall be tamped up and respiked to fully support the rails.

5-3. Tie requirements.

a. Consecutive defective ties. The occurrence of consecutive defective ties in Categories A and B track requires operating restrictions as specified below:

Number of Consecutive Defective ties	*Operating Restrictions*
0 to 2	None
3	Limit maximum speed to 10 mph
4	Limit maximum speed to 5 mph
5 or more	No operation

b. Joint ties. All joints shall be supported by at least one nondefective tie whose centerline is within 18 inches of the rail ends as shown in figure 5-2. At any location where a rail joint is not supported by at least one nondefective tie, operations shall not exceed 10 mph.

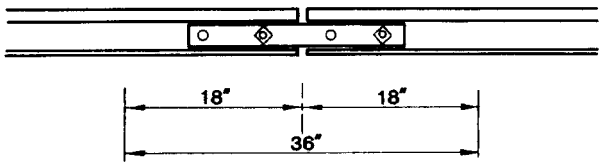

Figure 5-2. Required tie support at joints.

c. Tie spacing. If the existing tie spacing averages greater than 22 inches within the distance of a rail length, the desired spacing should be established during the next major maintenance cycle. For track constructed with an average tie spacing greater than 22 inches, the desired spacing should be established during the next track rehabilitation.

d. Missing or skewed ties. Missing or skewed (crooked) ties are undesirable in track. At any location where the center-to-center tie spacing measured along either rail exceeds 48 inches, operations shall not exceed 10 mph until additional tie support is provided, or skewed ties are straightened to reduce the spacing. Slightly skewed ties should be straightened during the next track rehabilitation.