Identifying Levels of Damage and Condition of Wood Poles and Non-Steel Framing on Transmission Line Structures and Supports

TD-1001M-JA06
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PPE:

Standard T-Line PPE, including:

- **Hard hat**
- **Safety glasses**
- **Gloves**
- **FR clothing**
- **Safety boots**
- **Fall protection**

Tools:

- **Binoculars**
- **Camera**
- **Hammer**
- **Non-conductive ruler**

Guidance Document References:

TD-1001M, "*Electric Transmission Preventive Maintenance Manual*"

Level of Use:

- ❑ **Information**
- ✓ **Reference**
- ❑ **Continuous**

Purpose:

This job aid provides the steps for consistent evaluation of damage on wood poles and non-steel framing on transmission line (T-Line) structures. The evaluation classifies the severity and potential impact of the damage or deterioration and provides the description of each condition level. The Qualified Company Representative (QCR) combines wood pole and non-steel framing condition with other as-found conditions and risk factors to assess and recommend the appropriate priority level.

The QCR should use this guide to select the appropriate condition representing the as-found damage or deterioration level for assigning the recommended priority code. Follow instructions in the *ETPM Manual*, in conjunction with this job aid, to document the condition(s) on an SAP notification.

Inspection Steps

Perform the following procedures during the detailed inspection to determine serviceability and integrity of the wood pole.

- Visual Inspection
- Sound Inspection (Hammer Test)

CAUTION

These steps DO NOT replace the requirements in the *Code of Safe Practices (CSP)*, Rules 414 and 417, or in Utility Procedure TD-2325P-02, "Testing Wood Poles Before Climbing."

Some poles have already been identified as needing replacement with the following yellow or red markings and do not need additional notifications:

Stubbable Pole | Non-Stubbable Pole | Deteriorated Pole Void Below Tag | Deteriorated Pole Immediate Attention | Deteriorated Pole Defect Above Tag

Visual Inspection of Physical Defects

- Surface decay and rot above ground line
- Termite galleries
- Insect/avian/woodpecker holes
  - Small – golf ball size
  - Medium – baseball size
  - Large – softball size
- Pole top crown damage or split-tops extending downward more than 6 inches from the pole top
- Fractures, breaks, or cracks
- Vehicle scars
- Exposed pockets due to burns or rot
- Excessive leaning, deflection (bending)
- Erosion/soil movement around the base

Sound Inspection/Hammer Test

- Remove any loose or decaying wood around the base of the pole and inspect for decay.
- Tap the pole lightly with a hammer or similar tool. Hit the pole squarely and allow the hammer to bounce. Hammer marks must be visible on the pole.
- Begin tapping at the base of the pole and work upwards around the pole to a height of about 7 feet or as high as can be reached.
- Listen for the sound produced to identify the location of possible internal voids or hollows that might indicate the presence of decay.
- If the visual inspection or sound inspection indicates that the pole is unsound, create a notification.

Evaluation of Intrusive Inspection Results

Follow Utility Procedure TD-2325P-01, "Intrusively Inspecting, Reinforcing, and Reusing Wood Poles," for intrusive inspections of wood poles. Reject and mitigate poles with remaining strengths below 75% (or 80% in high-wind areas), as follows:

- Restorable reject, remaining strength of 67–75%: stub pole. Choose priority E and FDA of Structure-Wood | Rotten | Stub.
- Restorable reject, remaining strength below 67%: stub pole. Choose priority E with expedited due date* and FDA of Structure-Wood | Rotten | Stub.
- Non-Restorable reject, remaining strength of 67–75%: replace pole. Choose priority E and FDA of Structure-Wood | Rotten | Replace.
- Non-Restorable reject, remaining strength below 67%: replace pole. Choose priority E with expedited due date* and FDA of Structure-Wood | Rotten | Replace.

* **NOTE:** evaluate site-specific conditions and location for severely deteriorated poles when assigning priority and due date.

Evaluation of Previously-Stubbed Poles

Follow Utility Procedure TD-2325P-01, "Intrusively Inspecting, Reinforcing, and Reusing Wood Poles," for replacing previously-stubbed wood poles. Replace the poles that exhibit the following conditions:

- Pole has a wood reinforcement stub.
- Pole has a steel truss AND at least one of the following conditions:
  - Pole does not meet minimum shell thickness requirements (>4" at 66" above groundline and at upper banding level; >2" at lower banding level)
  - Corrosion has penetrated more than 1/3 of the stub's perimeter across its width
  - Pole was stubbed following third-party mechanical damage (e.g., a car-pole)
  - Pole is adjacent to a railroad, major freeway, expressway, controlled access highway, or otherwise requires Grade A construction (i.e., is not a candidate for stubbing)
- Any other instance where the pole was not eligible for restoration or did not pass inspection in accordance with Utility Procedure TD-2325P-01.

For any scenario above, choose priority E with FDA of Structure-Wood | Rotten | Replace. Consider an expedited due date for severe deterioration and site-specific conditions.

Condition Codes:

Inspect the structure using the form to record issues. Determine the condition of each item. Consider all conditions to determine the appropriate Priority Code for any notification, if required.

- 5 = Heavy damage with safety concerns
- 4 = Heavy damage
- 3 = Moderate damage
- 2 = Light damage
- 1 = No visible damage

Wood Structure Condition Levels and Impact

Condition 5

Severe damage with an **immediate** safety concern **OR** potential to impact operations.

- Burnt/rotten > 50% material loss
- Crossarm bracing missing or broken, compromising insulator and conductor
- Bond wire broken < ¼-inch gap
- Severe pole top damage or split top compromising hardware or crossarm integrity
- Cracked (not checks)
- Broken

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code A.

Broken pole top (cracks run across wood grain)
FDA: Emergency | Storm Related | Replace

Severe woodpecker damage
FDA: Emergency | Storm Related | Replace

Wood Structure Condition Levels and Impact (continued)

Condition 5 (continued)

Severe damage with an **immediate** safety concern **OR** potential to impact operations.

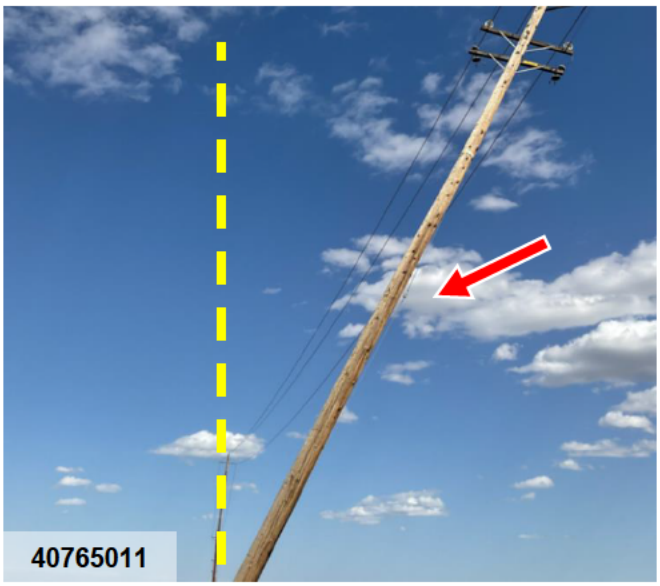
- Burnt/rotten > 50% material loss
- Crossarm bracing missing or broken, compromising insulator and conductor
- Bond wire broken < ¼-inch gap
- Severe pole top damage or split top compromising hardware or crossarm integrity
- Cracked (not checks)
- Broken

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code A.

Burnt pole
FDA: Emergency | Storm Related | Replace



Rotten pole causing excessive lean
FDA: Emergency | Storm Related | Replace

Wood Structure Condition Levels and Impact (continued)

Condition 5 (continued)

Severe damage with an **immediate** safety concern **OR** potential to impact operations.

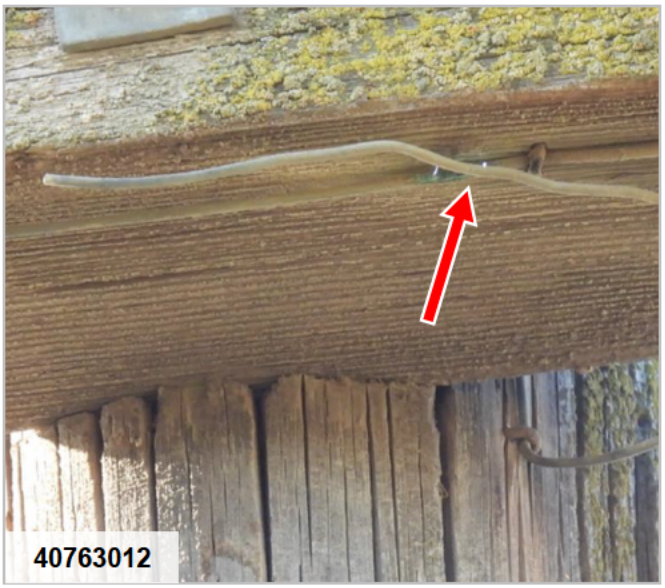
- Burnt/rotten > 50% material loss
- Crossarm bracing missing or broken, compromising insulator and conductor
- Bond wire broken < ¼-inch gap
- Severe pole top damage or split top compromising hardware or crossarm integrity
- Cracked (not checks)
- Broken

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code A.

Broken bond wire, < ¼" gap
FDA: Emergency | Storm Related | Repair



Broken bond wire, active arcing
FDA: Emergency | Storm Related | Repair

Wood Structure Condition Levels and Impact (continue)

Condition 4

Heavy damage with **possible** near-term impact to safety, facility integrity, or operations.

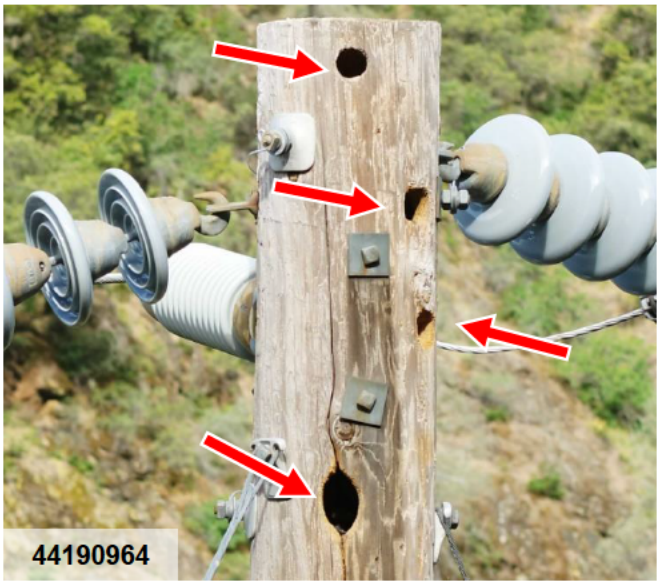
- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

* **NOTE:** Recommend to address within 3 months.

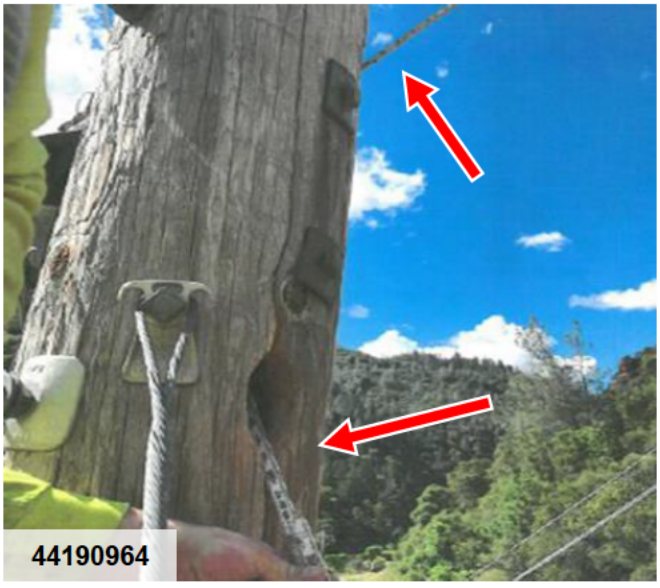
Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.
3. Choose shortened due date (3–12 months) based on conditions and location.



Multiple large woodpecker holes at pole top
FDA: Structure-Wood | No Good | Replace



Ruler shows continuous woodpecker cavity
FDA: Structure-Wood | No Good | Replace

Wood Structure Condition Levels and Impact (continued)

Condition 4 (continued)

Heavy damage with **possible** near-term impact to safety, facility integrity, or operations.

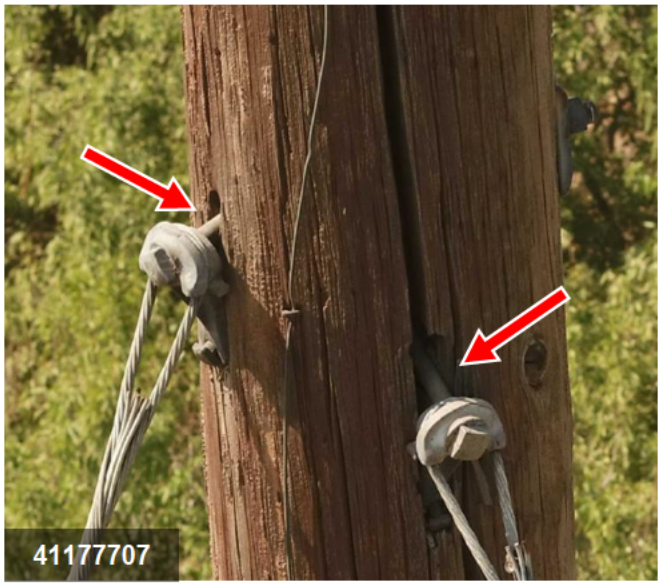
- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

* **NOTE:** Recommend to address within 3 months.

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.
3. Choose shortened due date (3–12 months) based on conditions and location.



Cracks (along wood grain) compromising guy hardware, bolts have begun to slip
FDA: Structure-Wood | No Good | Replace

Cracks (along wood grain) through guy pole hardware
FDA: Guy pole-Wood | Rotten | Replace

Wood Structure Condition Levels and Impact (continued)

Condition 4 (continued)

Heavy damage with **possible** near-term impact to safety, facility integrity, or operations.

- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

* **NOTE:** Recommend to address within 3 months.

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.
3. Choose shortened due date (3–12 months) based on conditions and location.

Rotten pole with wood stub, pole is leaning towards road

FDA: Structure-Wood | No Good | Replace

Broken bond wire > ¼" gap

FDA: Insulator bond wire-Wood | No Good | Repair

Wood Structure Condition Levels and Impact (continued)

Condition 3

Moderate damage with **possible** longer-term impact to safety, facility integrity, or operations.

- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

* **NOTE:** Recommend to address within 3 months.

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.

Medium woodpecker hole at pole top near hardware
FDA: Structure-Wood | No Good | Replace

Multiple unconnected woodpecker holes at pole top
FDA: Structure-Wood | No Good | Replace

Wood Structure Condition Levels and Impact (continued)

Condition 3 (continued)

Moderate damage with **possible** longer-term impact to safety, facility integrity, or operations.

- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

* **NOTE:** Recommend to address within 3 months.

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.

Split pole top, no anti-split bolt present.
Dead-end hardware not slipping.
FDA: Hardware-Wood | Missing | Install

Pole out of plumb, ~5'
FDA: Structure-Wood | No Good | Replace

Wood Structure Condition Levels and Impact (continued)

Condition 2

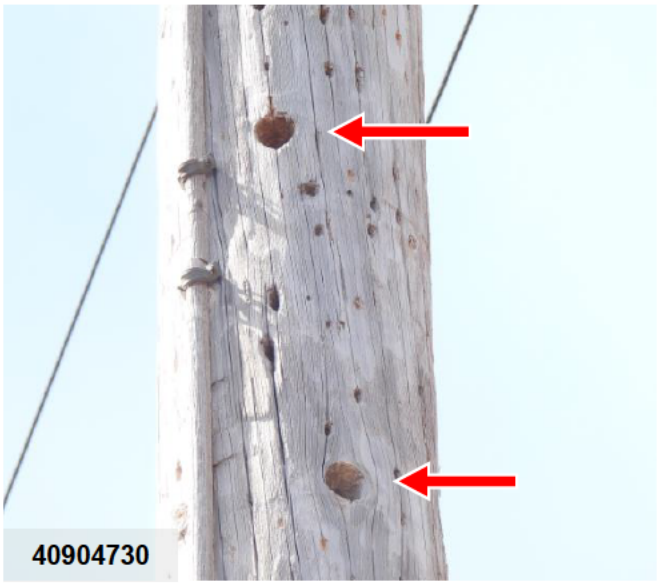
Light damage with no expected near-term impact to facility integrity or operations.

- Slide 1–5 feet
- Soil movement (erosion 1–3 feet in the ground)
- Worn/woodpecker/insect damage (medium or minor damage near hardware)
- Climbing steps in poor condition

Tags include work on wood poles, crossarms, cross braces, bonding, bearing plates.

Action:

1. Take photos.
2. Choose Priority Code F.



Medium unconnected woodpecker holes not near hardware
FDA: Structure-Wood | No Good | Repair

Rotten pole butt. Hole may destabilize the structure.
FDA: Structure-Wood | Debris | Remove

Wood Structure Condition Levels and Impact (continued)

Condition 2 (continued)

Light damage with no expected near-term impact to facility integrity or operations.

- Slide 1–5 feet
- Soil movement (erosion 1–3 feet in the ground)
- Worn/woodpecker/insect damage (medium or minor damage near hardware)
- Climbing steps in poor condition

Tags include work on wood poles, crossarms, cross braces, bonding, bearing plates.

Action:

1. Take photos.
2. Choose Priority Code F.

Erosion around pole
FDA: Structure-Wood | Debris | Remove

Medium hole (~2' deep) near base of pole.
No public access.
FDA: Structure-Wood | Debris | Remove

Wood Structure Condition Levels and Impact (continued)

Condition 1

No visible damage

Action:
1. Take photos.
2. No Priority Code.

Pole < 3' out of plumb
FDA: N/A

Old pole butt is not rotten
FDA: N/A

Superficial splits in pole
FDA: N/A

Crossarm Condition Levels and Impact

Condition 5

Severe damage with an **immediate** safety concern **OR** potential to impact operations.

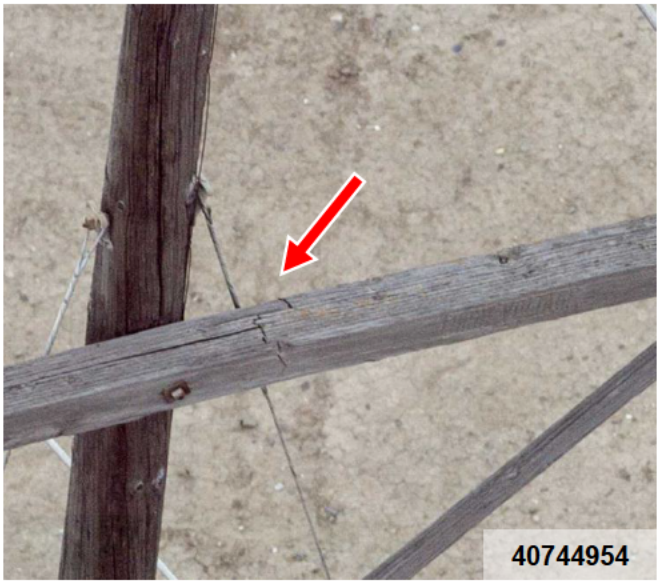
- Burnt/rotten > 50% material loss
- Crossarm bracing missing or broken, compromising insulator and conductor
- Bond wire broken < ¼-inch gap
- Severe pole top damage or split top compromising hardware or crossarm integrity
- Cracked (not checks)
- Broken

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code A.

Broken crossarm bracing, compromising insulators
FDA: Emergency-Wood | Other | Replace



Broken crossarm (cracks run across wood grain)
FDA: Emergency-Wood | Other | Replace

Crossarm Condition Levels and Impact (continued)

Condition 4

Heavy damage with **possible** near-term impact to safety, facility integrity, or operations.

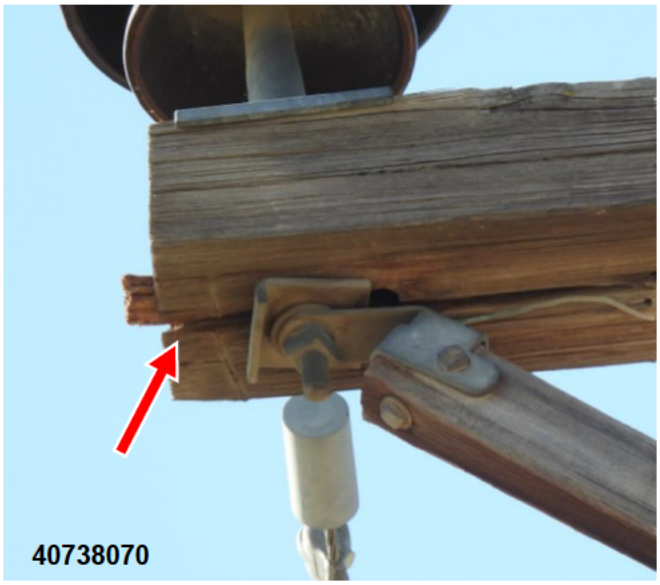
- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

* **NOTE:** Recommend to address within 3 months.

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.
3. Choose shortened due date (3–12 months) based on conditions and location.



Split crossarm compromising hardware
FDA: Crossarm-Wood | No good | Replace

Broken H-frame cross brace
FDA: Crossarm-Wood | No good | Replace

Crossarm Condition Levels and Impact (continued)

Condition 3

Moderate damage with **possible** longer-term impact to safety, facility integrity, or operations.

- Burnt/rotten 20–50% material loss
- Crossarm bracing loose/missing
- Bond wire broken > ¼-inch gap
- Pole top damage or split top, compromising hardware or crossarm integrity *
- Twisted
- H-Frame cross brace broken or missing *
- Out of plumb > 3 feet and compromising insulators and conductor *
- Slide > 5 feet
- Soil movement (erosion > 3 feet in the ground)
- Worm/woodpecker/insect damage (severe and/or near hardware)
- Standing water (not including seasonal conditions)
- Ground molding in poor condition or missing

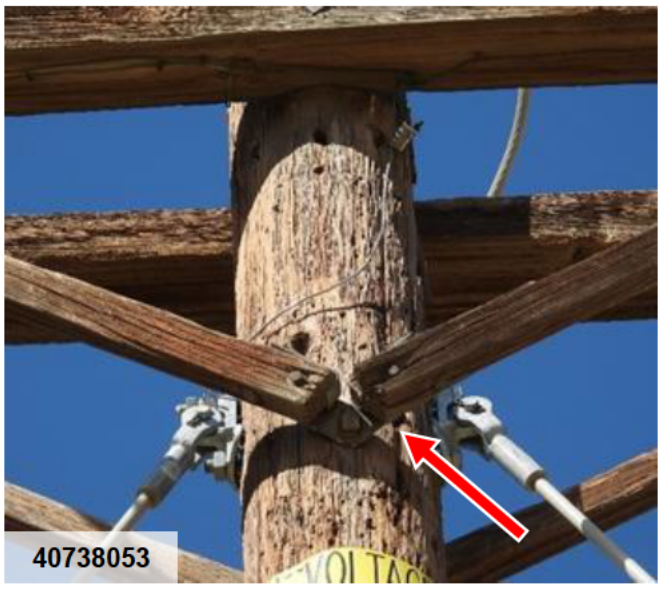
* **NOTE:** Recommend to address within 3 months.

Tags include work on wood poles, crossarms, crossbraces, bonding, bearing plates.

Action:

1. Take photos of damage.
2. Choose Priority Code E.

Twisted crossarm impacting insulators
FDA: Crossarm-Wood | No good | Replace



Loose crossarm bracing
FDA: Crossarm-Wood | No good | Replace

Crossarm Condition Levels and Impact (continued)

Condition 2

Light damage with no expected near-term impact to facility integrity or operations.

- Slide 1–5 feet
- Soil movement (erosion 1–3 feet in the ground)
- Worn/woodpecker/insect damage (medium or minor damage near hardware)
- Climbing steps in poor condition

Tags include work on wood poles, crossarms, cross braces, bonding, bearing plates.

Action:

1. Take photos.
2. Choose Priority Code F.

Rotten H-frame cross brace
FDA: Crossarm-Wood | No good | Replace

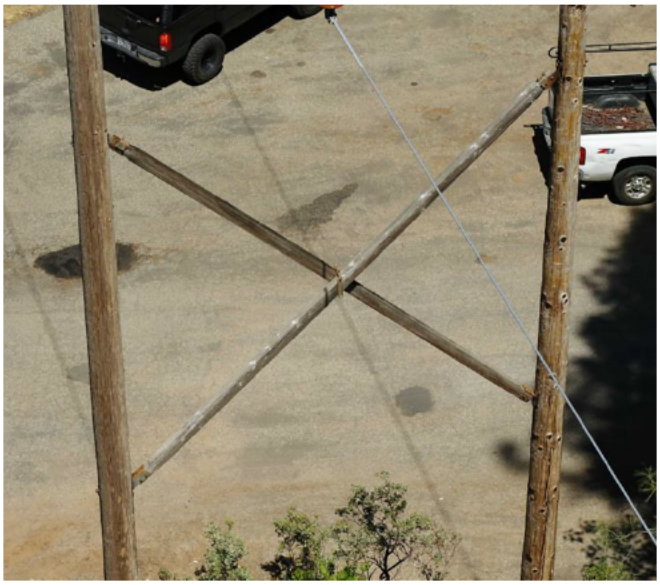
Crossarm Condition Levels and Impact (continued)

Condition 1

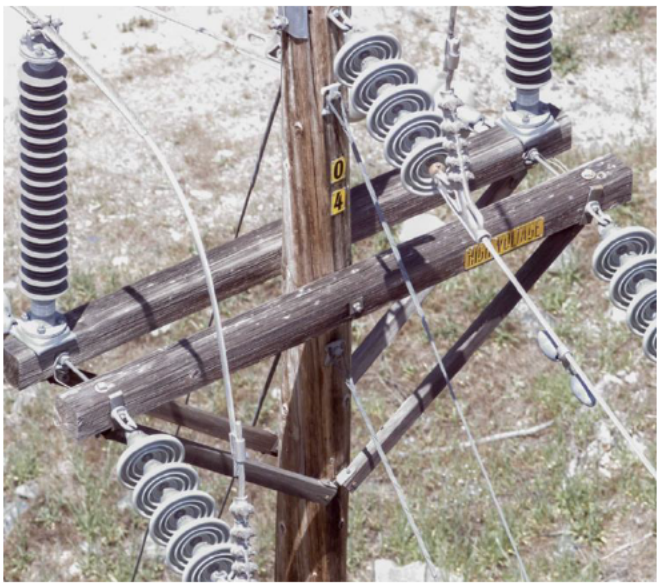
No visible damage

Action:

1. Take photos.
2. No Priority Code.



X-brace is weathered with no significant splits
FDA: N/A



Crossarm is weathered with no significant splits
FDA: N/A