

CESSNA AIRCRAFT COMPANY
MODEL 152 SERIES
SERVICE MANUAL

EXPANDED MAINTENANCE

1. Control Cables

- A. The chromium nickel steel wire is helically twisted into strands and the strands laid about other strands forming the flexible steel cable. The diameter of the cable is determined by the number of wires and the number of strands in the cable.
- (1) Construction of Cables
- (a) Cable diameter, 1/32 inch, 3 by 7 construction - Cable of this construction shall consist of three strands of seven wires each. There shall be no core in this construction. The cable shall have a length of lay of not more than eight times nor less than five times the nominal cable diameter.
 - (b) Cable diameter, 1/16 inch and 3/32 inch, 7 by 7 construction - Cable of this construction shall consist of six strands of seven wires each, laid around a core strand of seven wires. The cable shall have a length of lay of not more than eight times nor less than six times the nominal cable diameter.
 - (c) Cable diameter, 1/8 inch through 3/8 inch, 7 by 19 construction - Cable of this construction shall consist of six strands laid around a core strand. The wire composing the seven individual strands shall be laid around a central wire in two layers. The single core strand shall consist of a layer of 6 wires laid around the central wire in a right direction and a layer of 12 wires laid around the 7 wire strand in a right direction. The 6 outer strands of the cable shall consist of a layer of 6 wires laid around the central wire in a left direction and a layer of 12 wires laid around the 7 wire strand in a left direction.
 - (d) Lubrication - A pressure type friction preventative compound, having noncorrosive properties, is applied during construction as follows:
 - Friction preventative compound is continuously applied to each wire as it is formed into a strand so that each wire is completely coated.
 - Friction preventative compound is continuously applied to each strand as it is formed into a cable so that each strand is completely coated.
 - (e) Definitions - The following definitions pertain to flexible steel cable:
 - Wire - Each individual cylindrical steel rod or thread shall be designated as a wire.
 - Strand - Each group of wires helically twisted or laid together shall be designated as a strand.
 - Cable - A group of strands helically twisted or laid about a central core shall be designated as a cable. The strands and the core shall act as a unit.
 - Diameter - The diameter of cable is the diameter of the circumscribing circle.
 - Wire Center - The center of all strands shall be an individual wire and shall be designated as a wire center.
 - Strand Core - A strand core shall consist of a single straight strand made of preformed wires, similar to the other strands comprising the cable in arrangement and number of wires.
 - Preformed Type - Cable consisting of wires and strands shaped, prior to fabrication of the cable, to conform to the form or curvature which they take in the finished cable, shall be designated as preformed types.
 - Lay or Twist - The helical form taken by the wires in the strand and by the strands in the cable is characterized as the lay or twist of the strand or cable respectively. In a right lay, the wires or strands are in the same direction as the thread on a right screw and for a left lay, they are in the opposite direction.
 - Pitch (or length of lay) - The distances, parallel to the axis of the strand or cable, in which a wire or strand makes one complete turn about the axis, is designated as the pitch (or length of lay) of the strand or cable respectively.

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B. Inspection of Cable System

NOTE: For tools and equipment used in checking and rigging, refer to the appropriate sections of the Model 152 Service Manual.

- (1) Routing
 - (a) Examine cable runs for incorrect routing, fraying and twisting. Look for interference with adjacent structure, equipment, wiring, plumbing and other controls.
 - (b) Check cable movement for binding and full travel. Observe cables for slack when moving the corresponding controls.
- (2) Cable Fittings
 - (a) Check swaged fitting reference marks for an indication of cable slippage within the fitting. Inspect the fitting for distortion, cracks and broken wires at the fitting.
 - (b) Check turnbuckles for proper thread exposure. Also, check turnbuckle locking clip or safety wire.
- (3) Inspection of Control Cable.
 - (a) The control cable assemblies are subjected to a variety of environmental conditions and forms of deterioration that ultimately may be easy to recognize as wire/strand breakage or the not-so-readily visible types of corrosion and/or distortion. The following data will aid in detecting an unserviceable cable condition:
 - (b) Broken Wire
 - 1 Examine cables for broken wires by passing a cloth along the length of the cable. This will detect broken wires, if the cloth snags on the cable. Critical areas for wire breakage are those sections of the cable which pass through fairleads, across rub blocks and around pulleys. If no snags are found, then no further inspection is required. If snags are found or broken wires are suspected, then a more detailed inspection is necessary, which requires that the cable be bent in a loop to confirm the broken wires. Refer to Figure 1 for an example. Loosen or remove the cable to allow it to be bent in a loop as shown. Refer to Table 1 for bend diameter criteria. While rotating cable, inspect the bent area for broken wires.

Table 1. Loop and Coil Diameter Criteria

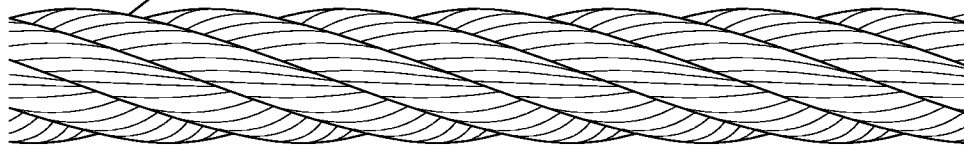
Cable Diameter	Smallest Allowable Loop Diameter (Loop Test)	Smallest Allowable Inside Diameter of Coil (Cable Storage)
1/32 Inch	1.6 Inch	4.7 Inch
1/16 Inch	3.2 Inch	9.4 inch
3/32 Inch	4.7 Inch	14.1 Inch
1/8 Inch	6.3 Inch	18.8 Inch
5/32 Inch	7.9 Inch	23.5 Inch
3/16 Inch	9.4 Inch	28.2 Inch

- 2 Wire breakage criteria for the cables in the flap, aileron, rudder and elevator systems are as follows:
 - a Individual broken wires are acceptable in primary and secondary control cables at random locations when there are no more than three broken wires in any given 10-inch (0.254 m) cable length.
- 3 Corrosion
 - a Carefully examine any cable for corrosion that has a broken wire in a section not in contact with wear producing airframe components, such as pulleys, fairleads, rub blocks etc. It may be necessary to remove and bend the cable to properly inspect it for internal strand corrosion, as this condition is usually not evident

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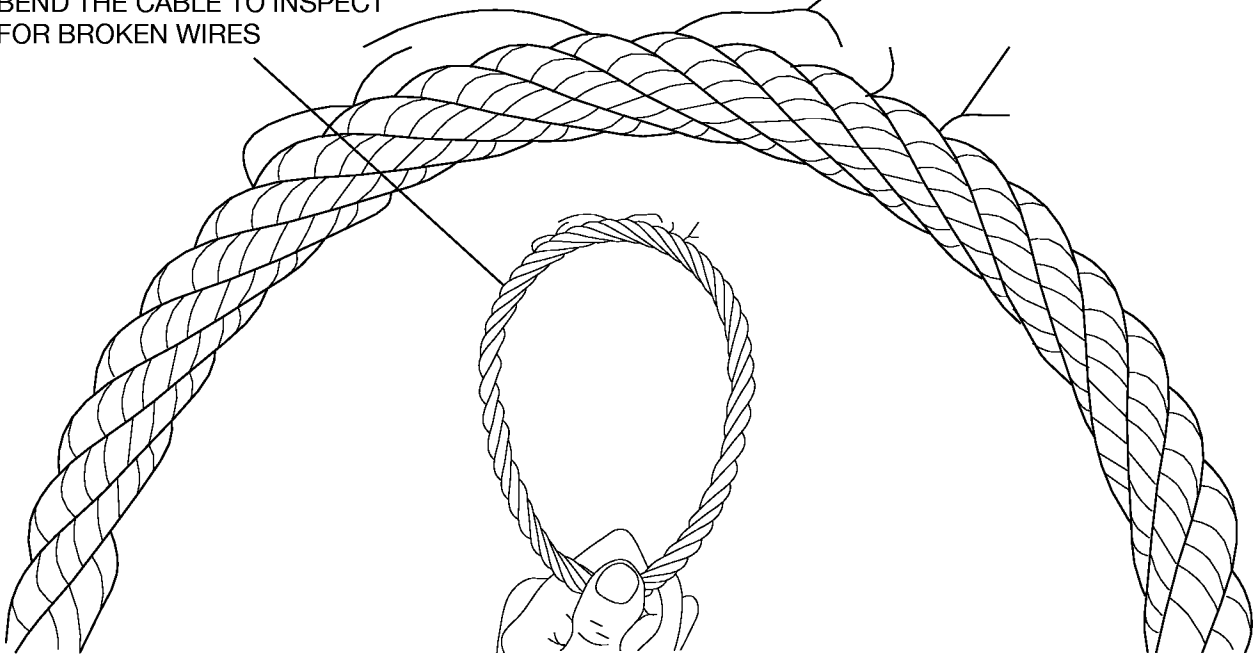
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BROKEN WIRE NOT FOUND WHEN RUBBED WITH A CLOTH ALONG THE LENGTH OF THE CABLE

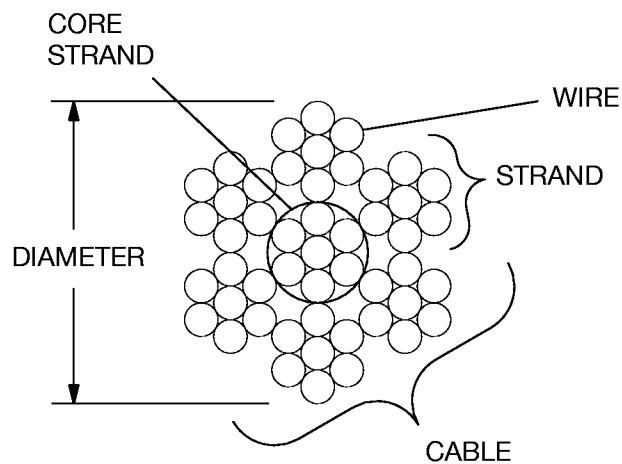


A CORRECT TECHNIQUE IS TO BEND THE CABLE TO INSPECT FOR BROKEN WIRES

BROKEN WIRE FOUND VISUALLY WHEN THE CABLE WAS REMOVED AND BENT



DO NOT BEND THE CABLE INTO A LOOP SMALLER THAN 50 CABLE DIAMETERS

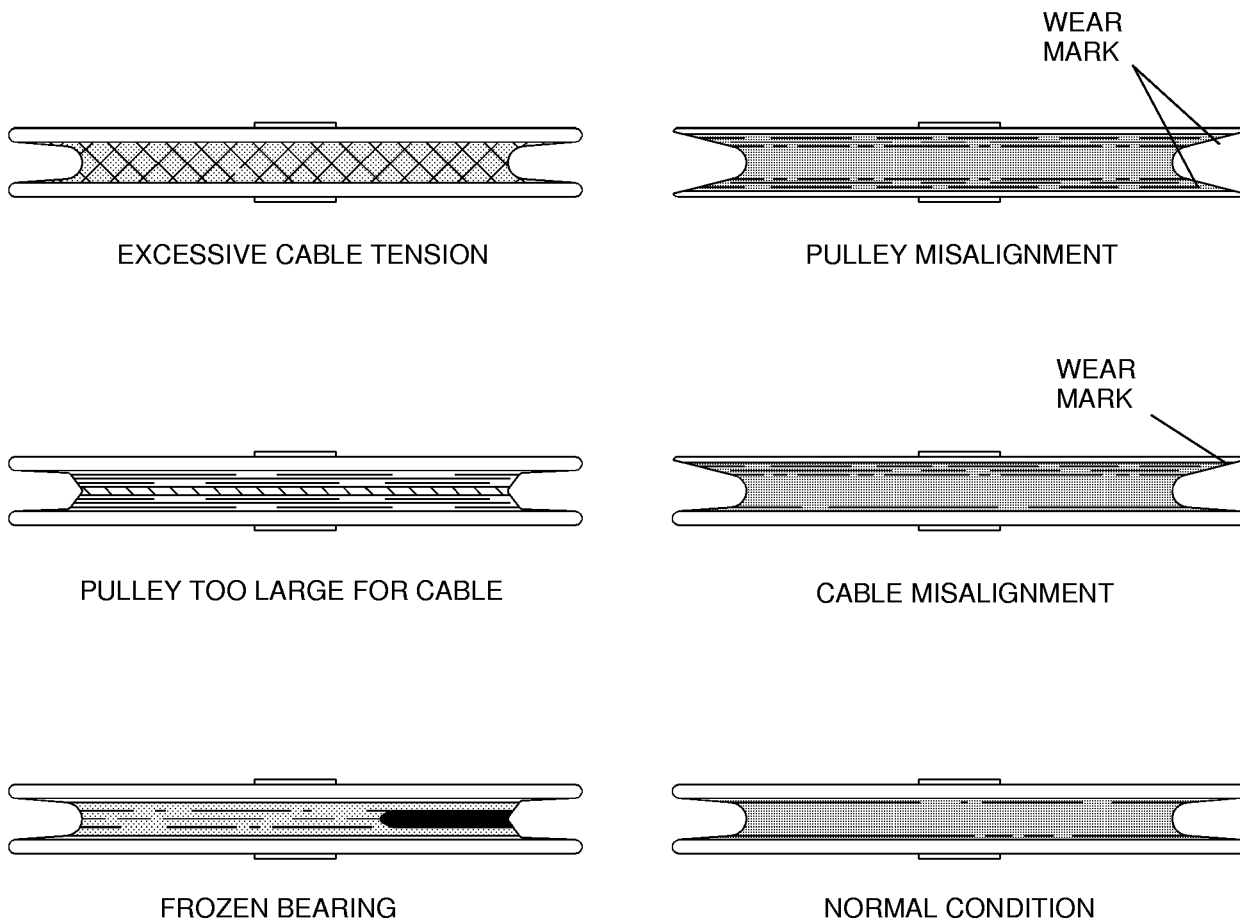


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Cable Broken Wires and Pulley Wear Patterns
Figure 1 (Sheet 1)

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Cable Broken Wires and Pulley Wear Patterns
Figure 1 (Sheet 2)

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on the outer surface of the cable. Replace cable if internal corrosion is found. For description of control cable corrosion, refer to Section 2A-30-01, paragraph 4(C), Steel Control Cables.

- b Areas conducive to cable corrosion are below the refreshment center, in the wheel well and in the tailcone. Also, if a cable has been wiped clean of its corrosion preventative lubricant and metal-brightened, the cable must be examined closely for corrosion.

(4) Pulleys

(a) Inspection of Pulleys

- 1 Inspect pulleys for roughness, sharp edges and presence of foreign material embedded in the grooves. Examine pulley bushings or bearings to ensure smooth rotation, freedom from flat spots and foreign material.
 - 2 Periodically rotate pulleys, which turn through a small arc, to provide a new bearing surface for the cable.
 - 3 Check pulley alignment. Check pulley brackets and guards for damage, alignment and security. Various failures of the cable system may be detected by analyzing pulley conditions. Refer to Figure 1 for pulley wear patterns; these include such discrepancies as too much tension, misalignment, pulley bearing problems and size mismatch between cable and pulley.

(5) Cable Storage

- (a) Cable assemblies shall be stored straight or in a coil. When stored in coil form, the coil inside diameter shall not be less than 150 times the cable diameter or bent in a radius of not less than 75 times the cable diameter. Refer to Table 1 for coil diameter criteria. Coils shall not be flattened, twisted or folded during storage. Storage requirements shall apply until the cable is installed in its normal position in the airplane. If only a part of the cable is installed in an assembly, cable storage requirements apply to the uninstalled portion of the cable.

(6) Flight Control Cable Inspection

(a) General Information

WARNING: If the flight control cable system(s) are removed, disconnected or cable section(s) are replaced, make sure that all rigging, travel checks, cable tensions and control surface checks are done in accordance with the procedures in the appropriate section for the affected flight control system.

NOTE: Flight control cable inspections are normally performed without removing or disconnecting any part of the flight control system. However, it may be necessary to derig or remove the cable to get access to the entire cable.

(b) Cable Inspection Procedure

- 1 Each flight control cable must be visually inspected along its entire length for evidence of broken wires, corrosion, fraying or other damage. Visual inspection may be via direct sight, mirror and flashlight or borescope.
 - 2 Visually check for proper routing along entire length of cable. Make sure that cables, pulleys, attaching sectors and bell cranks are free and clear of structure and other components

NOTE: Some systems use rub blocks, it is permissible for control cables to rub against these blocks.

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- 3 Each flight control cable will be physically inspected, by passing a cloth along the entire cable. Pay particular attention at all pulley, fairlead, bulkhead seal locations and other locations where the cable may be subject to chafing or wear.

NOTE: It may be necessary to have a second person move the flight control system being inspected to ensure that the entire cable run in an affected area is checked.

- 4 Any flight control cable which snags the cloth due to broken wires is to be slackened (if not previously slackened) and a loop test performed to identify number and location of individual broken wires (refer to Inspection of Control Cable). Wire breakage criteria is as follows for all cable systems:

a Individual broken wires are acceptable in any cable provided that no more than three individual wires are broken in any given ten-inch (0.254 m) cable length. If number of individual broken wires cannot be determined, cable is to be rejected. Any amount of cable or wire wear is acceptable, provided the individual broken wire criteria is met.

b Reject any cable if corrosion is found which appears to have penetrated into interior of cable. If extent of corrosion cannot be determined, cable is to be rejected.

- 5 Inspect all cable termination fittings (clevises, turnbuckles, anchors, swagged balls etc.) for security of installation, proper hardware and evidence of damage.

a All turnbuckles are required to be secured. Safety wire or prefabricated clips are acceptable.

- 6 Inspect cable pulleys.

a Inspect all pulleys for security of installation, evidence of damage and freedom of rotation.

b Pulleys which do not rotate with normal cable movement due to internal bearing failure are to be rejected.

c Pulleys with grooving etc., due to normal in-service use, are deemed serviceable, as long as overall function is not impaired.

- 7 Restore cable system as required following cable teardown (if performed).

a Tension tasks and other tasks specific to individual systems are described under applicable individual tasks.

b Any flight control cable system which has been torn down requires a flight control rigging check prior to release of airplane for flight.