## RUDDER CONTROL CABLES - INSPECTION/CHECK

*EFFECTIVITY: ALL*

1. General

A. This section gives the procedures to do the visual inspection of:

- the mechanism linkage in the autopilot tie-in.
- the main control input path.
- the control cables.

B. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

| *TASK NUMBER* | *DESCRIPTION* | *EFFECTIVITY* |
|---|---|---|
| 27-21-01-200-801-A | MECHANICAL LINKAGE IN THE AUTOPILOT TIE-IN - GENERAL VISUAL INSPECTION | ALL |
| 27-21-01-200-802-A | MAIN CONTROL INPUT PATH - GENERAL VISUAL INSPECTION | ALL |
| 27-21-01-200-803-A ♦ | RUDDER CONTROL CABLES PULLEYS AND QUADRANTS- DETAILED VISUAL INSPECTION | ALL |

TASK 27-21-01-200-801-A
*EFFECTIVITY: ALL*

2. MECHANICAL LINKAGE IN THE AUTOPILOT TIE-IN - GENERAL VISUAL INSPECTION

A. General

(1) The function of this inspection is to do a check for general condition of the equipment.

B. References

| *REFERENCE* | *DESIGNATION* |
|---|---|
| AMM MPP 06-42-00/100 | - |

C. Zones and Accesses

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 312 | 312AR | Structural area aft of the pressure bulkhead |

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

| *QTY* | *FUNCTION* | *PLACE* |
|---|---|---|
| 1 | Does the task | Area under cockpit floor |

I. Preparation

*SUBTASK 841-002-A*

(1) Open door 312AR (AMM MPP 06-42-00/100).

J. Inspect (General Visual) Mechanical Linkage in the Auto Pilot Tie-in (Figure 601)

*SUBTASK 212-002-A*

(1) Do an inspection of the linkage of the rudder autopilot servo mechanism. Examine the control cables for broken wires and loose parts.

(2) Make sure that the turnbuckles are installed with the locking clips.

(3) Make sure that the pulleys do not show signs of:

- excessive cables tension.

- out of alignment.
- cables out of alignment.

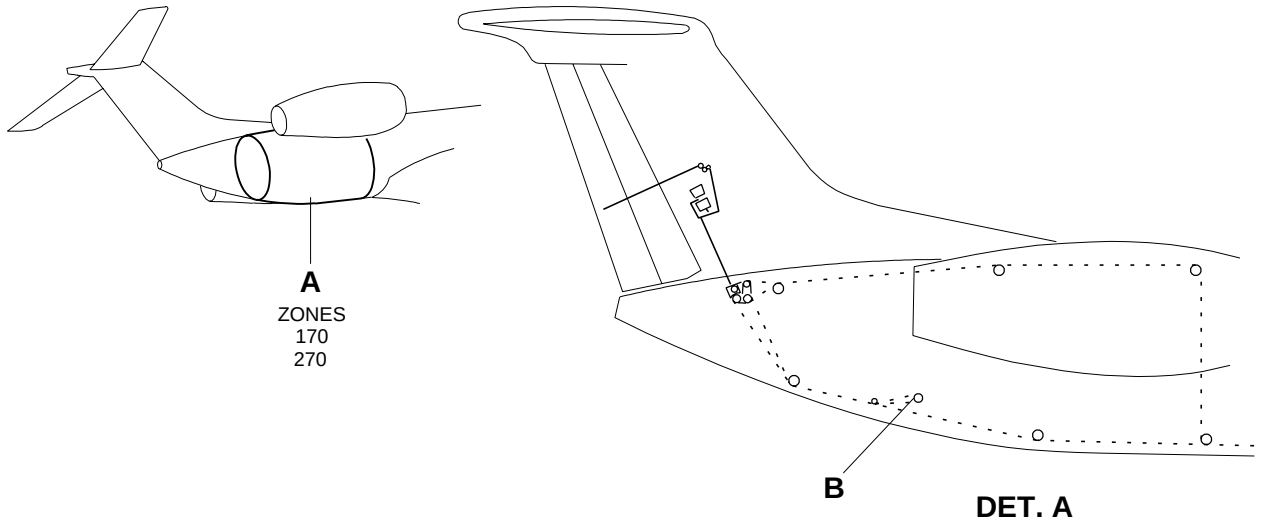
K. Follow-on

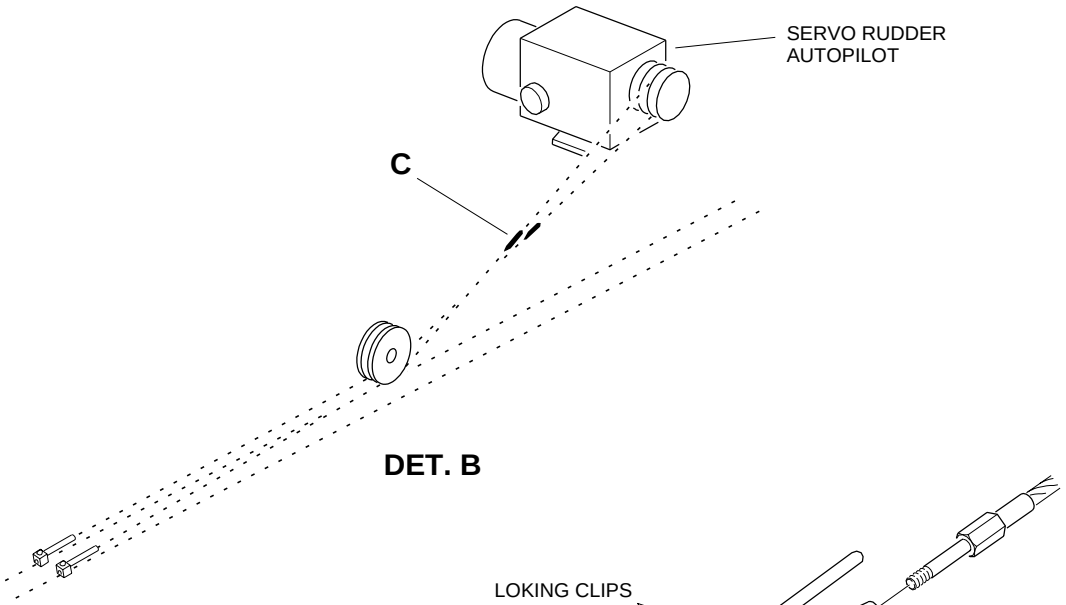
*SUBTASK 842-002-A*

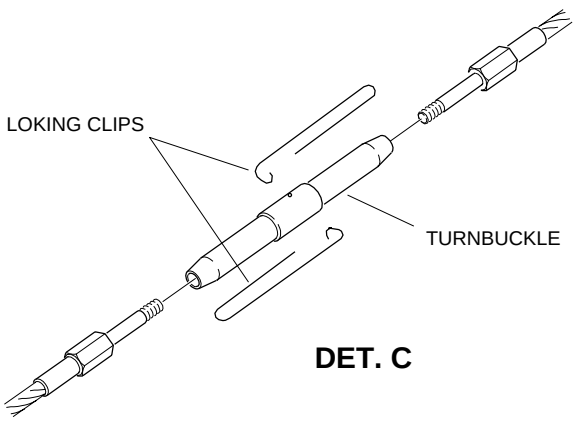
(1) Close door 312AR (AMM MPP 06-42-00/100).

*EFFECTIVITY: ALL*

Autopilot Tie-in - Visual Inspection
Figure 601

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TASK 27-21-01-200-802-A
*EFFECTIVITY: ALL*

3. MAIN CONTROL INPUT PATH - GENERAL VISUAL INSPECTION

A. General

(1) The function of this inspection is to do a check for general condition of the equipment.

B. References

| *REFERENCE* | *DESIGNATION* |
|---|---|
| AMM MPP 06-41-01/100 | - |
| AMM MPP 06-42-00/100 | - |
| AMM TASK 27-21-02-200-801-A/600 | RUDDER MAIN CONTROL FEEDBACK PATH PCU LINKAGE AND MOUNTING POINTS RUDDER ACTUATOR ATTACHMENTS HINGES AND CONNECTING RODS - DETAILED INSPECTION |
| AMM TASK 28-41-00-200-801-A/600 | - |

C. Zones and Accesses

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 123 | 123BL | Area under cockpit floor - LH |
| 221 | 221GF | Cockpit LH upper side |
| 231 | 231BF | Passenger Cabin |
| 231 | 231FF | Passenger Cabin |
| 231 | 231GF | Passenger Cabin |
| 241 | 241BF | Passenger Cabin |
| 241 | 241DF | Passenger Cabin |
| 251 | 251BF | Passenger Cabin |
| 251 | 251DF | Passenger Cabin |
| 251 | 251FF | Passenger Cabin |
| 251 | 251HF | Passenger Cabin |
| 261 | 261BF | Passenger Cabin |
| 261 | 261DF | Passenger Cabin |
| 271 | 271AF | Passenger Cabin |
| 271 | 271BF | Passenger Cabin |
| 271 | 271CF | Passenger Cabin |
| 272 | 272DR | Passenger Cabin |
| 312 | 312AR | Vertical-stabilizer |
| 325 | 325FR | Vertical-stabilizer |
| 325 | 325HR | Vertical-stabilizer |
| 325 | 325GR | Vertical-stabilizer |

D. Tools and Equipment

| ITEM | DESCRIPTION | PURPOSE | QTY |
|---|---|---|---|
| GSE 036 | Hydraulic platform | To get access to the Vertical-stabilizer | |

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

| QTY | FUNCTION | PLACE |
|---|---|---|
| 1 | Does the task | Fuselage and Vertical-stabilizer |

I. Preparation

*SUBTASK 841-003-A*

(1) Make sure that the aircraft is safe for maintenance.

(2) Do not do other tasks on the rudder.

(3) Make sure that the aircraft is de-energized.

(4) Make sure that the hydraulic system is not pressurized.

(5) Open the control rigging door 123BL (AMM MPP 06-41-01/100).

(6) Open access door 312AR and panels 325(FR/HR/GR) (AMM MPP 06-42-00/100) to gain access to the cargo compartment.

(7) Remove these floor panels (AMM MPP 06-41-01/100):

- 231BF,231FF and 231GF
- 241BF and 241DF
- 251BF, 251DF, 251FF and 251HF
- 261BF and 261DF
- 271AF, 271BF and 271CF
- 272DR

J. General Visual Inspection of the Main Control Input Path (Figure 602) (Figure 603) (Figure 604) (Figure 605)

*SUBTASK 212-003-A*

(1) Get access to the forward quadrant through control rigging door 123BL. Do a visual inspection of the:

- rod and the pedal assembly interconnecting rod for condition (Figure 602).
- bonding jumpers for condition (Figure 602).
- pedal connection to the pedal arms for condition (Figure 602).
- left and the right torque tube, cable guard and cotter pins (Figure 603).
- control cables for condition (Figure 602), (Figure 603), (Figure 604) and (Figure 605).
- turnbuckle and the locking clips (Figure 603).

(2) Get access to the control cables in the fuselage floor and do an inspection of the cables for broken wires (Figure 603).

(3) Make sure that the pulleys do not show signs of (Figure 603):

- excessive cable tension.
- misalignment.
- cables out of alignment.

(4) Get access to the rear torque tube and do an inspection of these items (Figure 604):

- right and left torque tubes.
- control cables for broken wires.
- Make sure that the control cable does not chafe against the APU fuel feed line.

(5) Do an inspection for the integrity of the mechanical linkage of the input rods to the right and left torque tube (Figure 604).

(6) Get access to the PCU and do a visual check for integrity of the mechanical linkage. Make sure that there are no signs of interferences and abnormal friction of these items (Figure 605):

- input rods with the summing lever.
- summing lever with the transfer link.
- transfer link with the servo valve.
- servo valve with the trim input lever.
- trim input lever with the load feel.
- summing lever with the feedback rod.
- feedback rod with the bellcrank. Refer to AMM TASK 27-21-02-200-801-A/600 for removal, inspection and installation of the concentric pins.
- rudder actuators with the rudder.

(7) Do an inspection of the hydraulic line connections to the rudder PCU and the rudder actuators for signs of leakage.

K. Follow-on

*SUBTASK 842-003-A*

(1) Do an inspection of the fuel quantity indication harness (AMM TASK 28-41-00-200-801-A/600).

NOTE: The inspection of the fuel quantity indication harness is a part of Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations (Section 6) of the Maintenance Review Board Report (MRB).

(2) Close cockpit underfloor access hatch 123BL (AMM MPP 06-41-01/100).

(3) Close access door 312AR and panels 325FR, 325HR and 325GR (AMM MPP 06-42-00/100).

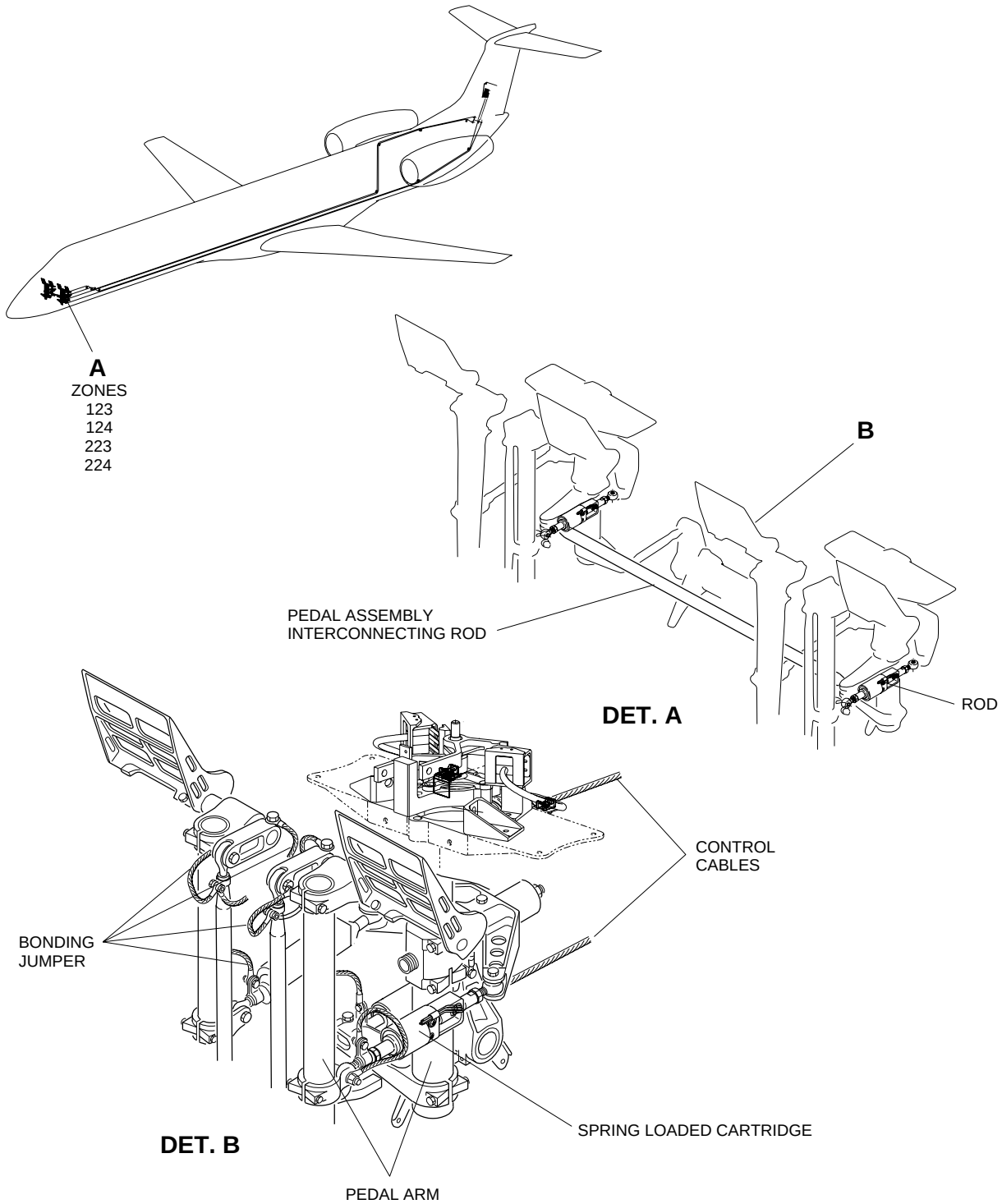
(4) Install these floor panels (AMM MPP 06-41-01/100):

- 231BF, 231FF and 231GF
- 241BF and 241DF
- 251BF, 251DF, 251FF and 251HF
- 261BF and 261DF
- 271AF, 271BF and 271CF
- 272DR

(5) Remove platform GSE 036.

*EFFECTIVITY: ALL*

Main Control Input Path - Visual Inspection
Figure 602

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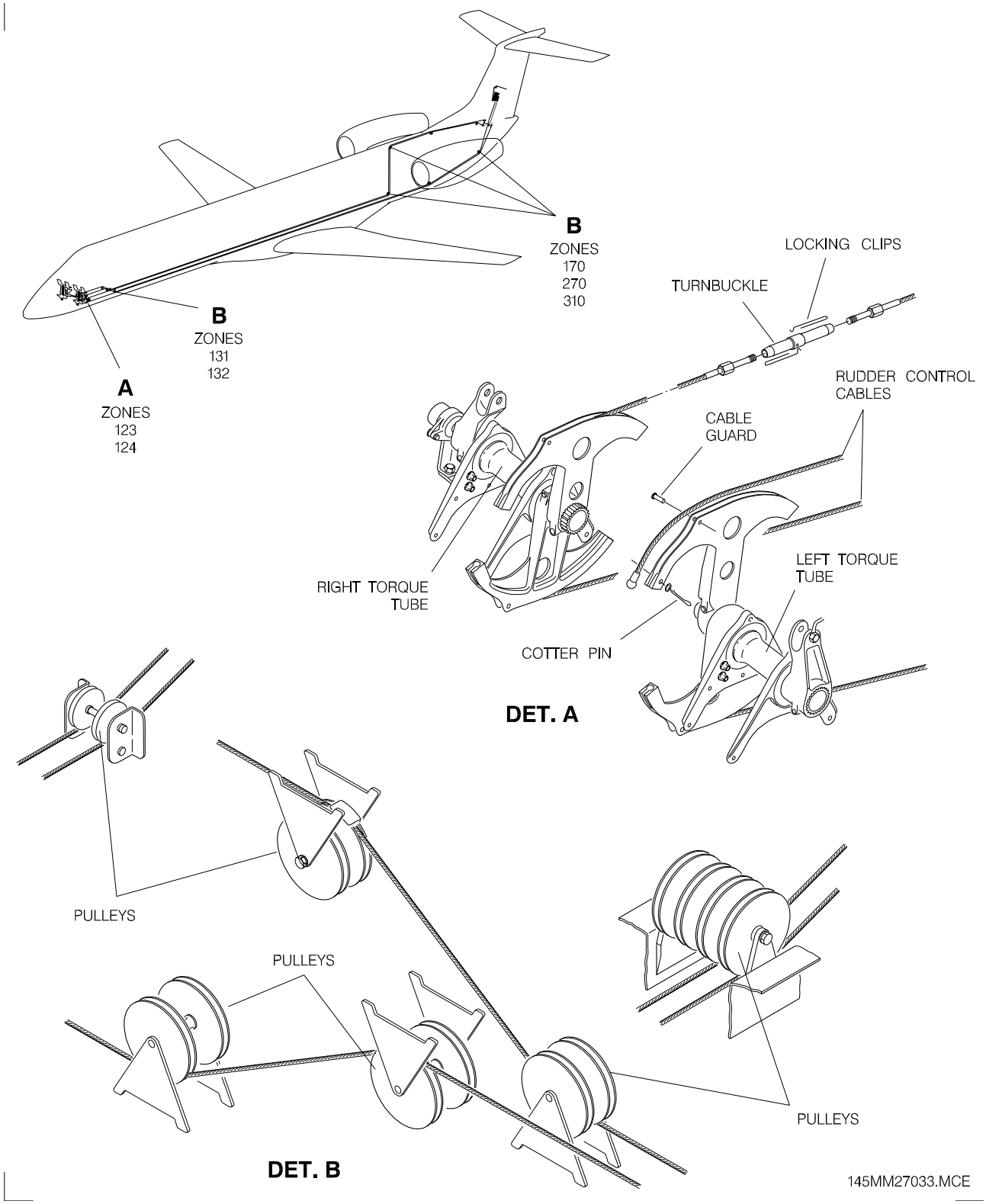
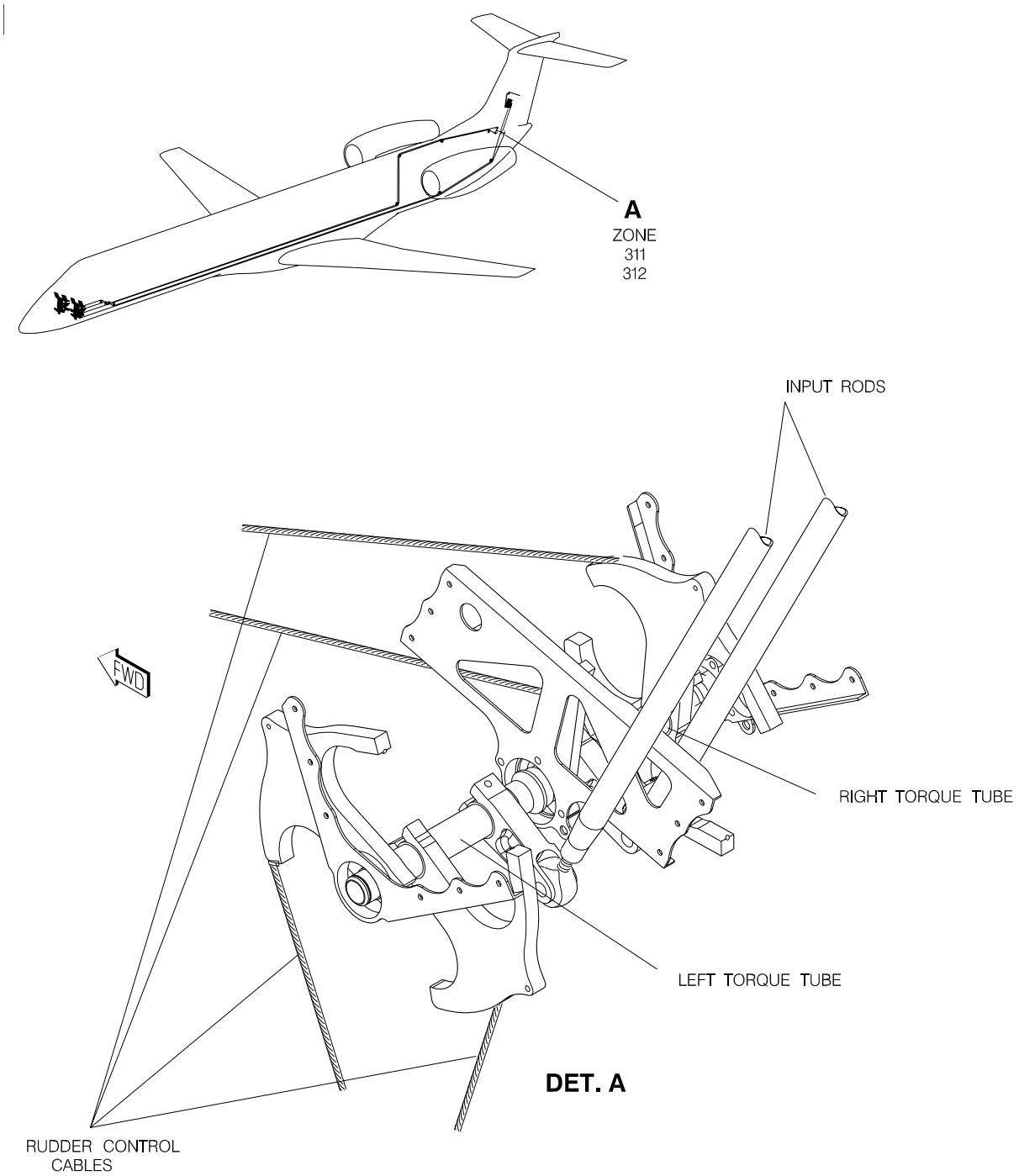
*EFFECTIVITY: ALL*

Forward Torque Tube and Pulleys - Visual Inspection
Figure 603



*EFFECTIVITY: ALL*

Rear Torque Tube - Visual Inspection
Figure 604

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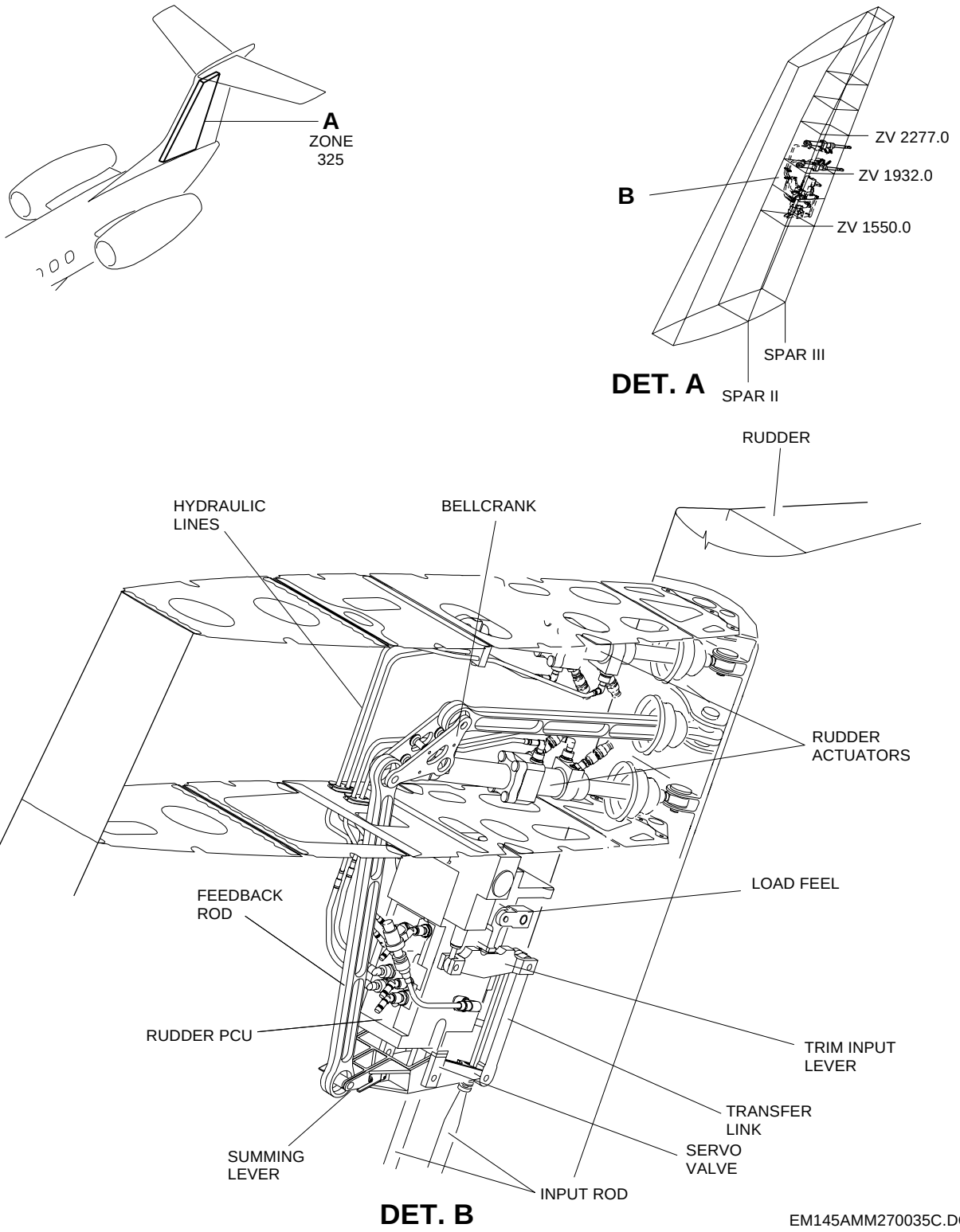
*EFFECTIVITY: ALL*

Mechanical Linkage of the PCU - Visual Inspection
Figure 605



TASK 27-21-01-200-803-A
*EFFECTIVITY: ALL*

4. RUDDER CONTROL CABLES PULLEYS AND QUADRANTS- DETAILED VISUAL INSPECTION

A. General

(1) This is a detailed visual inspection of the rudder control cables to make sure that they are in good condition.

(2) This procedure is applicable to the RH and LH, forward and rear control cables.

B. References

| *REFERENCE* | *DESIGNATION* |
|---|---|
| AMM MPP 06-41-01/100 | - |
| AMM MPP 06-41-02/100 | - |
| AMM MPP 06-42-00/100 | - |
| AMM MPP 27-21-01/400 | - REMOVAL/INSTALLATION |
| AMM TASK 20-20-01-200-801-A/600 | CONTROL CABLES - INSPECTION |
| AMM TASK 20-20-02-200-801-A/600 | PULLEYS - DETAILED INSPECTION |
| AMM TASK 25-21-01-000-801-A/400 | - |
| AMM TASK 25-21-01-400-801-A/400 | - |
| AMM TASK 25-27-02-000-801-A/400 | - |
| AMM TASK 25-27-02-400-801-A/400 | - |
| AMM TASK 25-51-01-000-801-A/400 | BAGGAGE COMPARTMENT LINING - REMOVAL |
| AMM TASK 25-51-01-400-801-A/400 | BAGGAGE COMPARTMENT LINING - INSTALLATION |
| AMM TASK 27-21-01-000-801-A/400 | RUDDER CONTROL CABLES - REMOVAL |
| AMM TASK 28-41-00-200-801-A/600 | - |

C. Zones and Accesses

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 123 | 123BL | Below the cockpit floor |
| 124 | | Below the cockpit floor |
| 131 | | Below the passenger cabin floor |
| 132 | | Below the passenger cabin floor |
| 141 | | Below the passenger cabin floor |
| 142 | | Below the passenger cabin floor |
| 151 | | Below the passenger cabin floor |
| 152 | | Below the passenger cabin floor |
| 153 | | Below the passenger cabin floor |
| 154 | | Below the passenger cabin floor |
| 155 | 155KZ | LH Wing stub |
| 155 | 155LZ | LH Wing stub |

(Continued)

| *ZONE* | *PANEL/DOOR* | *LOCATION* |
|---|---|---|
| 156 | 156KZ | RH Wing stub |
| 156 | 156LZ | RH Wing stub |
| 161 | | Below the passenger cabin floor |
| 162 | | Below the passenger cabin floor |
| 171 | | Below the baggage compartment floor |
| 172 | | Below the baggage compartment floor |
| 192 | 192AL | Center lower fairing |
| 192 | 192BR | Center lower fairing |
| 193 | 193AL | Aft lower fairing |
| 221 | 221GF | Below the cockpit floor |
| 231 | 231BF | Below the passenger cabin floor |
| 231 | 231FF | Below the passenger cabin floor |
| 231 | 231GF | Below the passenger cabin floor |
| 241 | 241BF | Below the passenger cabin floor |
| 241 | 241DF | Below the passenger cabin floor |
| 251 | 251BF | Below the passenger cabin floor |
| 251 | 251DF | Below the passenger cabin floor |
| 251 | 251FF | Below the passenger cabin floor |
| 251 | 251HF | Below the passenger cabin floor |
| 261 | 261BF | Below the passenger cabin floor |
| 261 | 261DF | Below the passenger cabin floor |
| 271 | 271AF | Baggage compartment floor |
| 271 | 271BF | Baggage compartment floor |
| 271 | 271CF | Baggage compartment floor |
| 271 | 271DF | Rear electronic compartment floor |
| 271 | 271EF | Rear electronic compartment floor |
| 271 | | Baggage compartment ceiling |
| 272 | | Baggage compartment ceiling |
| 273 | | Baggage compartment ceiling |
| 312 | 272DR | Structural area aft of rear pressure bulkhead |
| 312 | 312AR | Structural area aft of rear pressure bulkhead |
| 321 | 321 | RH Tail boom |

D. Tools and Equipment

| *ITEM* | *DESCRIPTION* | *PURPOSE* | *QTY* |
|---|---|---|---|
| Commercially Available | Flashlight | To make the lighting condition better for inspection | |

(Continued)

| *ITEM* | *DESCRIPTION* | *PURPOSE* | *QTY* |
|---|---|---|---|
| Commercially Available | Mirror | To do an inspection of the control cables | |
| Commercially Available | Magnifying Glass | To do an inspection of the control cables | |

E. Auxiliary Items

| *ITEM* | *DESCRIPTION* | *PURPOSE* | *QTY* |
|---|---|---|---|
| Commercially Available | Dry Cloth | To do an inspection of the control cables | AR |
| Commercially available | Brush | To apply the corrosion preventive to the cables | 1 |

F. Consumable Materials

| *SPECIFICATION (BRAND)* | *DESCRIPTION* | *QTY* |
|---|---|---|
| MIL-C-16173 Class 1, Grade 3 | Esgard PL-3 | AR |

G. Expandable Parts

Not Applicable

H. Persons Recommended

| *QTY* | *FUNCTION* | *PLACE* |
|---|---|---|
| 1 | Does the task | Below the floor of cockpit, passenger cabin, and baggage compartment |
| 1 | Help the other | Cockpit |

I. Preparation

*SUBTASK 841-004-A*

(1) On the Circuit Breaker Panel, open the AP1, RUDDER 1, and RUDDER 2 circuit breakers and attach a DO-NOT-CLOSE tag to them.

(2) Remove cockpit underfloor access hatch 123BL (AMM MPP 06-41-01/100).

(3) Open door 272DR (AMM MPP 06-41-01/100).

(4) Open door 312AR (AMM MPP 06-42-00/100).

(5) Remove access panels 155KZ, 155LZ, 156KZ,156LZ, 192AL and 192BR (AMM MPP 06-41-01/100).

(6) Remove the passenger seats (AMM TASK 25-21-01-000-801-A/400).

(7) Remove the cable protection shroud (AMM TASK 25-27-02-000-801-A/400).

(8) Remove floor panels 221GF, 231BF, 231FF, 231GF, 241BF, 241DF, 251BF, 251DF, 251FF, 251HF, 261BF, 261DF, 271AF, 271BF, 271CF, 271DF and 271EF (AMM MPP 06-41-02/100).

(9) Remove the baggage compartment ceiling ( AMM TASK 25-51-01-000-801-A/400).

J. Detailed Visual Inspection of Rudder Control Cables, Pulleys, and Quadrants (Figure 606)

*SUBTASK 220-002-A*

CAUTION:
- DO NOT USE ABRASIVE CLOTH OR SOLVENTS TO CLEAN THE CABLES. THIS CAN MAKE THE CORROSION PROCESS AND WEAR FASTER BECAUSE OF THE REMOVAL OF THE CABLE INTERNAL LUBRICANT.
- DO NOT USE GREASE OR OTHER PRODUCTS TO LUBRICATE THE CONTROL CABLES.
- BE SPECIALLY CAREFUL WITH THE SEGMENTS THAT GO THROUGH FAIRLEADS, SEALING ASSEMBLIES, SPACERS, AROUND PULLEYS, AND NEAR TERMINALS AND BELLCRANKS. AT THESE LOCATIONS DAMAGE AND WEAR CAN OCCUR MORE EASILY.

(1) Do a check of the cable at its attachment to terminals for general conditions.

NOTE: Use a mirror and a flashlight to examine the parts.

(2) Make sure that the cables are not deflected by fairleads, rub strips, air-pressure seals, or grommets during usual operation.

**WARNING: BE CAREFUL WITH YOUR HANDS WHILE THE CABLES ARE MOVED.**

(3) With the aid of a cloth moved along the cable, examine the cables for broken wires.

- If the cloth catches on the cables and snags are found, remove the cable ( AMM TASK 27-21-01-000-801-A/400) and do (AMM TASK 20-20-01-200-801-A/600).

NOTE: Actuate rudder pedals to move the cables to full travel in the two directions to examine the cable around the pulleys, pressure seals, and grommets.

**WARNING: BE CAREFUL WITH YOUR HANDS WHILE THE CABLES ARE MOVED.**

(4) With a magnifying glass, examine the cables for external wear and corrosion.

- If one single wire of a strand shows wear that reduces its cross section by more than 40 percent, the cable must be replaced (AMM MPP 27-21-01/400) (Figure 607).
- If signs of corrosion are found, remove the cable ( AMM TASK 27-21-01-000-801-A/400) and examine the cable for internal corrosion (AMM TASK 20-20-01-200-801-A/600).

NOTE: Actuate the rudder pedals to move the cable to full travel in the two directions to examine the cable around the pulleys, pressure seals, and grommets.

(5) Do an inspection of the pressure seals and make sure that they do not show signs of wear. If necessary, replace them as follows.

(a) Remove the bolts (11) and washers (12). Refer to DET. C, Figure 606.

(b) Release the plate and move it forward.

(c) Put a new pressure seal between the plate and gasket.

NOTE: To prevent air leakage, make sure that the larger diameter of the gasket assy taper drill is turned to the semi-sphere seal.

(d) Finger-tighten the bolts (11) with their washers (12).

(e) Move the rudder pedal left or right to align the pressure seal with the cable.

(f) Tighten the bolts (11) until they touch the structure surface and turn the bolts (11) by a 1/4 turn more.

NOTE: Make sure that the pressure seal is aligned with the cable and there is no friction between the control cable and the plate to prevent jamming and wear.

(g) Make sure that the cable moves freely and smoothly after the installation of the new pressure seal.

(6) Do an inspection of the pulleys. Refer to AMM TASK 20-20-02-200-801-A/600.

(7) Do an inspection of the rudder quadrants for loose and missing parts. Refer to Figure 606 DET. A.

(8) (ON AIRCRAFT WITH RUDDER−CONTROL CARBON−STEEL CABLES) Apply a thin layer of Esgard PL-3, with a brush, along the control cables.

K. Follow-on

*SUBTASK 842-004-A*

(1) On the Circuit Breaker Panel, close the AP1, RUDDER 1, and RUDDER 2 circuit breakers and remove the DO-NOT-CLOSE tag from them.

(2) Do an inspection of the fuel quantity indication harness AMM TASK 28-41-00-200-801-A/600.

NOTE: The inspection of fuel quantity indication harness is a part of Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations (Section 6) on the Maintenance Review Board Report (MRB).

(3) Install floor panels 221GF, 231BF, 231FF, 231GF, 241BF, 241DF, 251BF, 251DF, 251FF, 251HF, 261BF, 261DF, 271AF, 271BF, 271CF, 271DF, and 271EF (AMM MPP 06-41-02/100).

(4) Install the cable protection shroud (AMM TASK 25-27-02-400-801-A/400).

(5) Install the passenger seats (AMM TASK 25-21-01-400-801-A/400).

(6) Install the baggage compartment ceiling ( AMM TASK 25-51-01-400-801-A/400).

(7) Install cockpit underfloor access hatch 123BL (AMM MPP 06-41-01/100).

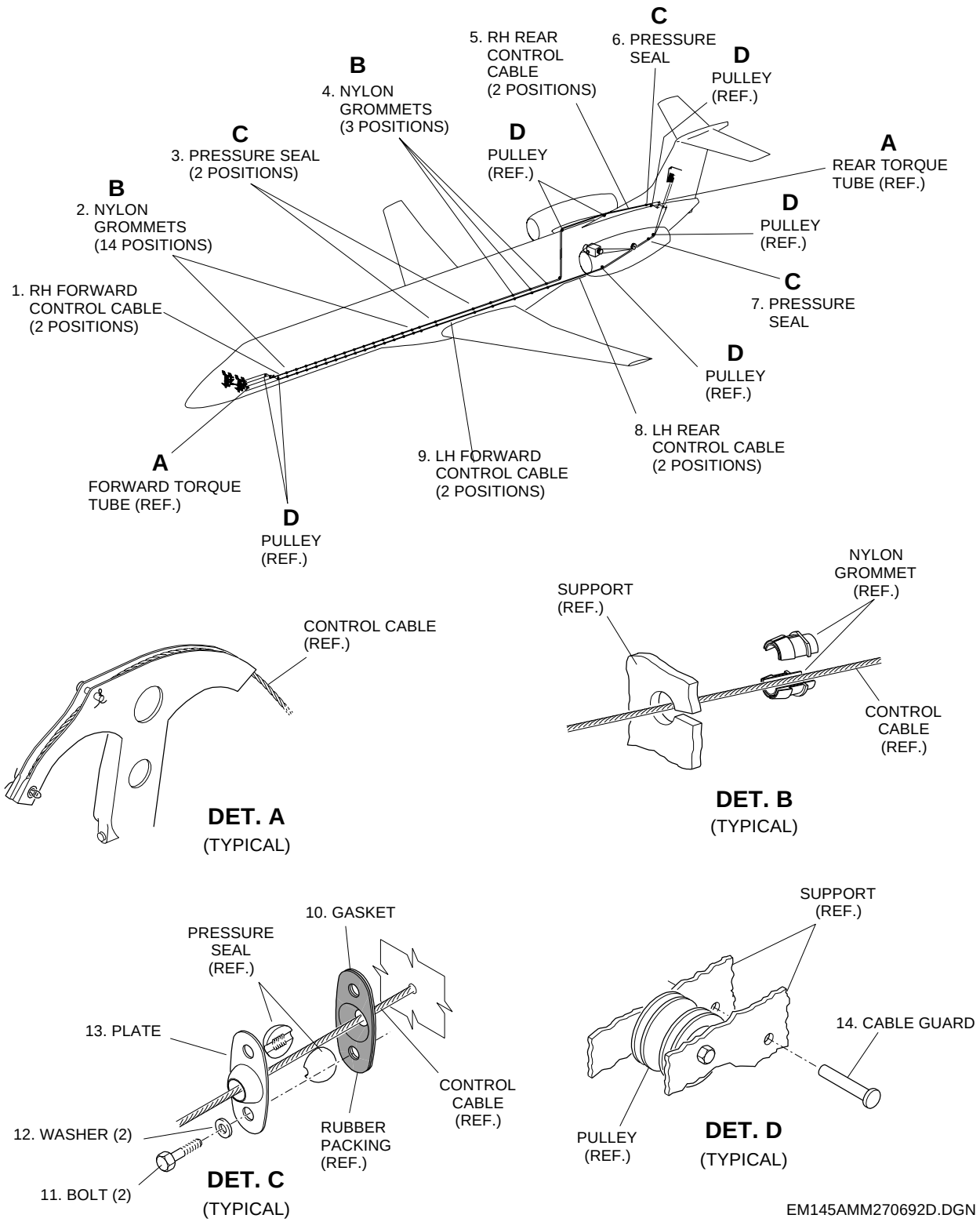
(8) Close door 272DR (AMM MPP 06-41-01/100).

(9) Close door 312AR (AMM MPP 06-42-00/100).

(10) Install access panels 155KZ, 155LZ, 156KZ,156LZ, 192AL,192BR and 193CL (AMM MPP 06-41-01/100).

*EFFECTIVITY: ALL*

Rudder Control Cable, Pulleys, and Quadrants - Detailed Visual Inspection
Figure 606

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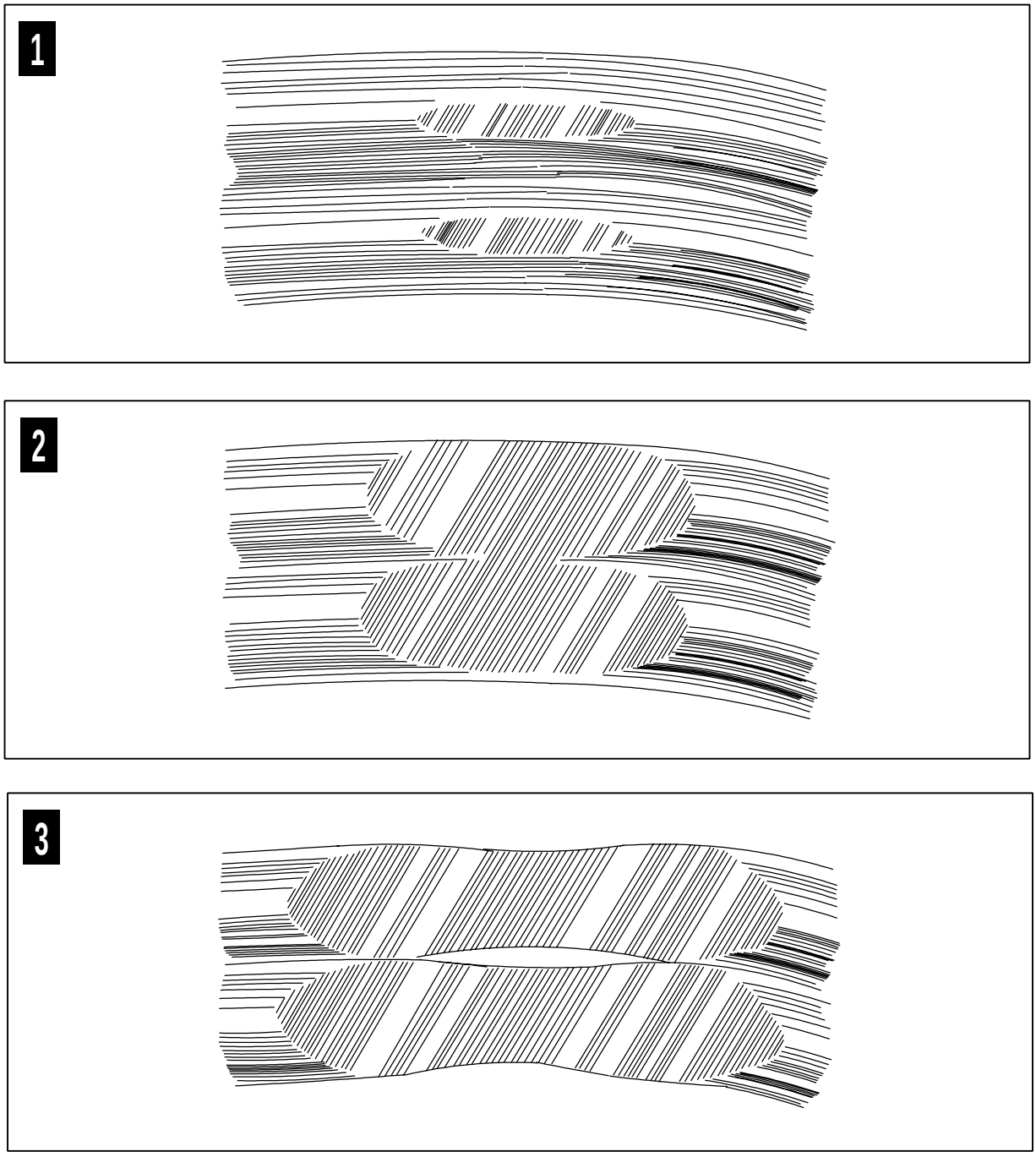
*EFFECTIVITY: ALL*
External Cable Wear
Figure 607




1 − WEAR OF OUTER WIRE IS LESS THAN 40% OF ITS CROSS SECTION AND THE WORN AREAS ARE NOT BLENDED.

2 − WEAR OF OUTER WIRE IS FROM 40% TO 50% OF ITS CROSS SECTION AND THE WORN AREAS ARE BLENDED.

3 − WEAR OF OUTER WIRE IS MORE THAN 50% OF ITS CROSS SECTION AND THERE IS VISIBLE SPACE BETWEEN WIRES.

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