OVERSTEERING - INSPECTION/CHECK

EFFECTIVITY: ALL

1. General

   A. This section gives the procedures to do an inspection on the aircraft after a NLG shock strut steering overtravel indication.

   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*
05-50-32-200-801-A	OVERSTEERING - GENERAL VISUAL INSPECTION	ALL

TASK 05-50-32-200-801-A
EFFECTIVITY: ALL

2. OVERSTEERING - GENERAL VISUAL INSPECTION

A. General

(1) A NLG steering overtravel inspection is necessary when these conditions occur:

(a) When you find the NLG shock strut steering overtravel target bracket damaged or cracked.

(b) When you have an incorrect or accidental NLG shock strut steering operation.

(2) The steering overtravel is an incorrect or accidental operation which turns the NLG shock strut wheels more than the maximum steering angle with the towbar attached.

(3) When the NLG shock strut is turned more than the maximum steering angle with the towbar attached, damage to the NLG, NLG wheelwell and/or aircraft structure can occur. When this condition occurs, do an inspection for damage on some of the components.

B. References

REFERENCE	*DESIGNATION*
AMM MPP 20-10-02/200	- MAINTENANCE PRACTICES
AMM TASK 07-10-00-500-801-A/200	-
AMM TASK 07-10-00-500-802-A/200	-
AMM TASK 20-00-00-910-801-A/200	AIRCRAFT SAFE PROCEDURES FOR MAINTENANCE SERVICES - MAINTENANCE PRACTICES
AMM TASK 29-10-00-860-802-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH EMDP
AMM TASK 29-10-00-860-803-A/200	HYDRAULIC SYSTEM - BLEED OF AIR
AMM TASK 32-30-00-700-801-A/500	EXTENSION AND RETRACTION SYSTEM - OPERATIONAL CHECK
AMM TASK 32-34-00-600-801-A/300	MLG AND NLG - LUBRICATION
AMM TASK 32-50-00-700-803-A/500	NOSE WHEEL STEERING SYSTEM ACTUATION - OPERATIONAL CHECK
AMM TASK 32-50-07-000-801-A/400	FEEDBACK UNIT (POTENTIOMETER) - REMOVAL
AMM TASK 32-50-07-400-801-A/400	FEEDBACK UNIT (POTENTIOMETER) - INSTALLATION
SRM 51-20-01	-

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

ITEM	*DESCRIPTION*	*PURPOSE*	*QTY*
Commercially available	Rubber Gloves Resistant to Phosphate-Ester Base Fluid	For protection of the hands	2
Commercially available	Rubber Goggles Resistant to Phosphate-Ester Base Fluid	For protection of the eyes	2
Commercially Available	Soft Lint-Free Cloth	To clean the components	AR

F. Consumable Materials

SPECIFICATION (BRAND)	*DESCRIPTION*	*QTY*
MEP 13-073	Rhodiasolve E-23	AR
MIL-G-23827	Aeroshell 33	AR
MOLYKOTE DX	Corrosion-Inhibiting Compound (MOLYKOTE DX)	AR
SAE AMS 3277, Type I, Class B2	Sealant PR1826B2ALO	AR
MH ELECOLIT 414	Adhesive, Polyester Electro Conductive Grey	AR

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	*FUNCTION*	*PLACE*
1	Does the task	NLG
1	Helps the other technician	NLG

I. Preparation

SUBTASK 841-002-A

WARNING: MAKE SURE THAT THE AIRCRAFT IS IN A SAFE CONDITION BEFORE YOU DO THE MAINTENANCE PROCEDURES. THIS IS TO PREVENT INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.

(1) Do the procedure to make the aircraft safe for maintenance of the landing gear (AMM TASK 20-00-00-910-801-A/200).

(2) On the circuit breaker panel, open the STEER, ELEC PUMP 1 and DOOR CMD circuit breakers and attach the tags (DO-NOT-CLOSE) to them.

(3) Make sure that the pressure in hydraulic system No. 1 is fully released (AMM TASK 29-10-00-860-802-A/200).

(4) Lift the aircraft on jacks (AMM TASK 07-10-00-500-801-A/200).

WARNING: ALWAYS OBEY THE MANUFACTURER'S HEALTH AND SAFETY PRECAUTIONS WHEN YOU USE CLEANING MATERIAL. DO NOT GET THIS MATERIAL ON YOUR SKIN, IN YOUR EYES OR MOUTH. PUT ON APPROVED PROTECTIVE CLOTHING, GOGGLES AND GLOVES. CLEANING MATERIAL IS DANGEROUS AND, IF YOU DO NOT OBEY THESE PRECAUTIONS, INJURY CAN OCCUR.

(5) Clean the NLG components and the structures with a lint-free wiper cloth and solvent RHODIASOLVE E-23.

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(6) Remove the CIC and sealant from the components and areas where it can hinder the inspection or give incorrect results.

J. NLG Shock Strut Steering Overtravel - General Visual Inspection Procedure

SUBTASK 212-002-A

(1) Refer to the flowchart on Figure 601 which brings a summary of the necessary actions to be done when one of the conditions of NLG steering overtravel occurred.

(2) Although these procedures are conservative, there is no satisfactory procedure to quantify the severity of the failure on internal components because of incorrect or accidental operation of the NLG shock strut steering.

(3) When the conditional inspection tells you that you must examine the NLG, NLG wheelwell and/or aircraft structure, look for the conditions that follow:

- Bent components
- Black powder residues around, and that trail from, fasterners in composites (sign of loose fasteners)
- Cracks
- Delamination
- Discoloration
- Fastener holes that become oversized
- Fasteners that pulled out or are missing
- Fiber breakouts
- Hydraulic fluid leakage
- Interference
- Loose fasteners
- Loose paint (paint flakes)

- Misalignment
- Nicks or gouges
- Pulled-apart structure
- Scratches
- Twisted parts (distortion)
- Wrinkles or buckles in the structure
- Other signs of damage

(4) All the inspections are classified as GVI.

(5) If during the inspections you find an evidence of damage, go to the related section of the NDI Manual and do the specific inspection, if applicable.

(6) In zone 711, do an inspection on the NLG shock strut, as follows (Figure 602 - sheet 1 and sheet 2):

(a) Examine the lower and upper torque links (4) and (5) and their hinge fittings (3).

(b) Examine the steering motor assy (2) and both steering cylinders (1).

(c) Examine the steering indicator fuse (8).

1 If necessary, replace the steering indicator fuse (8) as follows:

a Remove the screws (6) and (7) and replace the steering indicator fuse (8).

b Install the screws (6) and (7).

c Use a torque wrench to torque the screws (6) and (7) to 3.0 - 4.0 N.m (27 - 35 lb.in).

WARNING: APPLY THE SEALANT IN OPEN AREAS AND DO NOT BREATHE ITS GASES. THE COMPOUNDS USED ARE POISONOUS AND FLAMMABLE. WEAR THE APPLICABLE GLOVES AND RESPIRATORS NOT TO PERMIT THESE MIXTURES TO TOUCH YOUR SKIN FOR LONG TIME. IF THE WORK IS TO BE DONE INDOORS, HAVE SUFFICIENT AIR AVAILABLE.

d With a soft bristle brush, apply two continuous bead of sealant PR1826B2ALO on the head of screws (6) and (7) (SRM 51-20-01).

NOTE:
- Sealant P/S 870B-2 or sealant AC-665 B-2 can be used as alternatives to sealant PR1826B2ALO. Twenty-four hours after the application of these alternative sealants, apply a layer of varnish 683-3-2/X-310A to them.
- For the correct preparation of surface, mixing process and application, refer to the manufacturer's technical data sheet.

(7) At zone 711, do an inspection on the NLG steering cylinders (13) and (7), as follows (Figure 603 - sheet 1 and sheet 2):

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WARNING: ALWAYS OBEY THE MANUFACTURER'S HEALTH AND SAFETY PRECAUTIONS WHEN YOU USE CLEANING MATERIAL. DO NOT GET THIS MATERIAL ON YOUR SKIN, IN YOUR EYES OR MOUTH. PUT ON APPROVED PROTECTIVE CLOTHING, GOGGLES AND GLOVES. CLEANING MATERIAL IS DANGEROUS AND, IF YOU DO NOT OBEY THESE PRECAUTIONS, INJURY CAN OCCUR.

WARNING: BE CAREFUL WHEN YOU USE THE METHYL ETHYL KETONE (MEK). PUT ON SAFETY GOGGLES AND PROTECTIVE CLOTHING. DO NOT BREATHE THE GAS OR DUST. DO THE WORK IN AN AREA WHICH HAS A GOOD FLOW OF AIR. THE METHYL ETHYL KETONE (MEK) IS POISONOUS AND HIGHLY FLAMMABLE.

WARNING: PUT ON APPROVED SAFETY GLASSES BEFORE YOU CUT LOCKWIRE. IF YOU DO NOT OBEY THIS PRECAUTION, PIECES OF LOCKWIRE CAN HIT YOUR EYES AND CAUSE INJURIES.

CAUTION: CAUTION: DO NOT LET PIECES OF DISCARDED LOCK WIRE STAY IN THE AIRCRAFT OR IN THE WORK AREA. IF NECESSARY, USE A VACUUM CLEANER TO REMOVE THEM.

(a) Remove steering cylinder (13) from the NLG shock strut assy, as follows (Figure 603 - sheet 1 and sheet 2):

1. Use a polyethylene spatula, a lint-free wiper cloth and RHODIASOLVE E-23 to remove the sealant from all the parts which are to be installed again (SRM 51-20-01).
2. Disconnect the steering hydraulic tube (1) from its fitting connection on the steering cylinder (13).
3. Cut and remove the lockwire (16) from the screw (17).
4. Loosen and remove the screw (17) and washer (15) from the steering cylinder (13), bracket (19) and ground plate (14).
5. Remove the ground plate (14) from the steering cylinder (13).
6. Loosen and remove the cotter pin (20), nut (21), washer (22) and screw (18).
7. Remove the bracket (19) from the steering cylinder (13) and the NLG shock strut.
8. Remove the steering cylinder (13) from the NLG shock strut.
9. Remove the preformed packing (10) from the steering cylinder (13).
10. Remove the piston (12) from the steering cylinder (13).
11. Remove the seal assembly (11) from the piston (12).

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CAUTION: CAUTION: DO NOT LET PIECES OF DISCARDED LOCK WIRE STAY IN THE AIRCRAFT OR IN THE WORK AREA. IF NECESSARY, USE A VACUUM CLEANER TO REMOVE THEM.

(b) Remove steering cylinder (7) from the NLG shock strut assy, as follows (Figure 603 - sheet 1 and sheet 2):

1. Use a polyethylene spatula, a lint-free wiper cloth and RHODIASOLVE E-23 to remove the sealant from all the parts which are to be installed again (SRM 51-20-01).
2. Disconnect the steering hydraulic tube (1) from its fitting connection on the steering cylinder (7).
3. Cut and remove the lockwire (6) from the screw (5).
4. Loosen and remove the screw (5) and washer (4) from the steering cylinder (7) and bracket (3).
5. Loosen and remove the cotter pin (25), nut (24), washer (23) and screw (2).
6. Remove the bracket (3) from the steering cylinder (7) and the NLG shock strut.
7. Remove the steering cylinder (7) from the NLG shock strut.
8. Remove the preformed packing (9) from the steering cylinder (7).
9. Remove the piston (8) from the steering cylinder (7).
10. Remove the seal assembly (26) from the piston (8).

(c) Clean the parts with a lint-free wiper cloth and solvent RHODIASOLVE E-23.

(d) Examine both steering cylinders (7) and (13) internally and externally.

(e) Examine the pistons (8) and (12).

(f) Make sure that none of the conditions specified on step J. (3) occurs.

(g) At zone 711, do an inspection on the internal gears (1), as follows (Figure 604):

1. Remove the feedback unit (potentiometer) from the NLG shock strut assy (AMM TASK 32-50-07-000-801-A/400).
2. Remove the grease AEROSHELL 33 to get access to inspect the gear (1) and rack (2).
3. Manually turn the steering motor assembly to 170° maximum (CW and CCW), to help the removal of grease AEROSHELL 33.
4. Examine the gear (1) on the steering motor assy.

5. Manually turn the steering motor assembly to 170° maximum (CW and CCW), to help the inspection of the gear (1) on both sides of steering feedback housing.

6. Examine the rack (2).

7. Manually turn the steering motor assembly to 170° maximum (CW and CCW), to help the inspection of the rack (2) on both sides of steering cylinders housing.

8. Examine the contour of the teeth on both gear (1) and rack (2) for signs of damage or broken teeth.

9. Make sure that none of the conditions specified on step J. (3) occurs.

10. Install the feedback unit (potentiometer) to the NLG shock strut assy (AMM TASK 32-50-07-400-801-A/400).

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WARNING: APPLY THE SEALANT IN OPEN AREAS AND DO NOT BREATHE ITS GASES. THE COMPOUNDS USED ARE POISONOUS AND FLAMMABLE. WEAR THE APPLICABLE GLOVES AND RESPIRATORS NOT TO PERMIT THESE MIXTURES TO TOUCH YOUR SKIN FOR LONG TIME. IF THE WORK IS TO BE DONE INDOORS, HAVE SUFFICIENT AIR AVAILABLE.

CAUTION: CAUTION: DO NOT LET PIECES OF DISCARDED LOCK WIRE STAY IN THE AIRCRAFT OR IN THE WORK AREA. IF NECESSARY, USE A VACUUM CLEANER TO REMOVE THEM.

(h) Install steering cylinder (13) to the NLG shock strut assy, as follows (Figure 603 - sheet 1 and sheet 2):

1. Install the seal assembly (11) on the piston (12) and then install the piston inside the steering cylinder (13).
2. Install the preformed packing (10) on the steering cylinder (13).
3. Apply a thin layer of corrosion inhibitive compound Molykote DX to the thread of the screw (17).
4. Apply Elecolit 414 to the inboard face of the steering cylinder flange (13), the inboard face of the ground plate (14) where it touches the outboard face of the steering cylinder flange, the inboard face of the bracket (19) where it touches the outboard face of the flange of the steering cylinders (13) and the face of the bracket (19) where it touches the flange of the shock strut.
5. Install the steering cylinder (13), bracket (19) and ground plate (14) on the NLG shock strut with screw (17) and washer (15).
6. Use a torque wrench to torque the five screws (17) to 12.0 - 14.0 N.m (106 - 124 lb.in).
7. Apply Elecolit 414 to the thread of the screw (18).
8. Install the screw (18), washer (22) and nut (21) on the bracket (19) and NLG shock strut.
9. Use a torque wrench to torque the nut (21) to 6.0 - 7.5 N.m (53 - 66 lb.in).
10. Install the cotter pin (20) on the screw (18) and nut (21).
11. Remove the unwanted corrosion inhibitive compound Molykote DX with a lintfree wiper cloth moistened with RHODIASOLVE E-23.
12. Safety the screws (17) with lockwire (16) (AMM MPP 20-10-02/200).

(i) With a soft bristle brush, apply two continuous bead of sealant PR1826B2ALO, as follows (SRM 51-20-01):

1. Around the interface of steering cylinder (13) with the main fitting.
2. Around the head of screws (17) and (18), washers (15) and (22) and nut (21).
3. Around the interface of bracket (19) and ground plate (14) with the steering cylinder (13).

NOTE:
- Sealant P/S 870B-2 or sealant AC-665 B-2 can be used as alternatives to sealant PR1826B2ALO. Twenty-four hours after the application of these alternative sealants, apply a layer of varnish 683-3-2/X-310A to them.
- For the correct preparation of surface, mixing process and application, refer to the manufacturer's technical data sheet.

WARNING: ALWAYS OBEY THE MANUFACTURER'S HEALTH AND SAFETY PRECAUTIONS WHEN YOU USE HYDRAULIC FLUID. DO NOT GET HYDRAULIC FLUID ON YOUR SKIN, IN YOUR EYES OR MOUTH. PUT ON APPROVED PROTECTIVE CLOTHING AND GOGGLES. HYDRAULIC FLUID IS TOXIC AND CAN CAUSE INJURIES.

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WARNING: PUT ON APPROVED SAFETY GLASSES BEFORE YOU CUT LOCKWIRE. IF YOU DO NOT OBEY THIS PRECAUTION, PIECES OF LOCKWIRE CAN HIT YOUR EYES AND CAUSE INJURIES.

WARNING: APPLY THE SEALANT IN OPEN AREAS AND DO NOT BREATHE ITS GASES. THE COMPOUNDS USED ARE POISONOUS AND FLAMMABLE. WEAR THE APPLICABLE GLOVES AND RESPIRATORS NOT TO PERMIT THESE MIXTURES TO TOUCH YOUR SKIN FOR LONG TIME. IF THE WORK IS TO BE DONE INDOORS, HAVE SUFFICIENT AIR AVAILABLE.

CAUTION: CAUTION: DO NOT LET PIECES OF DISCARDED LOCK WIRE STAY IN THE AIRCRAFT OR IN THE WORK AREA. IF NECESSARY, USE A VACUUM CLEANER TO REMOVE THEM.

(j) Install steering cylinder (7) to the NLG shock strut assy, as follows (Figure 603 - sheet 1 and sheet 2):

1. Install the seal assembly (26) on the piston (8) and then install the piston inside the steering cylinder (7).
2. Install the preformed packing (9) on the steering cylinder (7).
3. Apply a thin layer of corrosion inhibitive compound Molykote DX to the thread of the screw (5).
4. Apply Elecolit 414 to the inboard face of the steering cylinder flange (7), the inboard face of the bracket (3) where it touches the outboard face of the flange of the steering cylinders (7) and the face of the bracket (3) where it touches the flange of the shock strut.
5. Install the steering cylinder (7) and bracket (3) on the NLG shock strut with screw (5) and washer (4).
6. Use a torque wrench to torque the five screws (5) to 12.0 - 14.0 N.m (106 - 124 lb.in).

7. Apply Elecolit 414 to the thread of the screw (2).

8. Install the screw (2), washer (23) and nut (24) on the bracket (3) and NLG shock strut.

9. Use a torque wrench to torque the nut (24) to 6.0 - 7.5 N.m (53 - 66 lb.in).

10. Install the cotter pin (25) on the nut (24) and screw (2).

11. Remove the unwanted corrosion inhibitive compound Molykote DX with a lintfree wiper cloth moistened with RHODIASOLVE E-23.

12. Safety the screws (5) with lockwire (6) (AMM MPP 20-10-02/200).

(k) With a soft bristle brush, apply two continuous bead of sealant PR1826B2ALO, as follows (SRM 51-20-01):

1. Around the interface of steering cylinder (7) with the main fitting.

2. Around the head of screws (2) and (6) and washers (5) and (23) and nut (24).

3. Around the interface of bracket (3) with the steering cylinder (7).

NOTE: • Sealant P/S 870B-2 or sealant AC-665 B-2 can be used as alternatives to sealant PR1826B2ALO. Twenty-four hours after the application of these alternative sealants, apply a layer of varnish 683-3-2/X-310A to them.

• For the correct preparation of surface, mixing process and application, refer to the manufacturer's technical data sheet.

(l) At zone 711, connect the steering hydraulic tube (1) as follows (Figure 603 - sheet 1):

1. Connect the steering hydraulic tube (1) to its fitting connection on the steering cylinders (7) and (13).

2. Use a torque wrench to torque the steering hydraulic tube (1) to 10.0 - 14.0 N.m (89 - 124 lb.in).

K. Follow-on

SUBTASK 842-002-A

(1) On the circuit breaker panel, remove the tags (DO-NOT-CLOSE) and close the STEER, ELEC PUMP 1 and DOOR CMD circuit breakers.

(2) Bleed the hydraulic system (AMM TASK 29-10-00-860-803-A/200).

(3) Lubricate the NLG shock strut assy (AMM TASK 32-34-00-600-801-A/300).

(4) Do the operational test of the landing gear (AMM TASK 32-30-00-700-801-A/500).

(5) Do the operational test of the nose wheel steering (AMM TASK 32-50-00-700-803-A/500).

CAUTION: UNDETECTED DAMAGE ON THE STEERING COMPONENT CAN CAUSE A LOSS OF STEERING SYSTEM AND/OR DAMAGE TO THE AIRCRAFT.

(6) After the inspections and tests, if you think that there is a damage that you can not get access or can not see, specially on the internal gear and rack, it is recommended that you remove the NLG shock strut assy and send it to a repair shop for detailed inspections.

(7) Lower the aircraft and remove the jacks (AMM TASK 07-10-00-500-802-A/200).

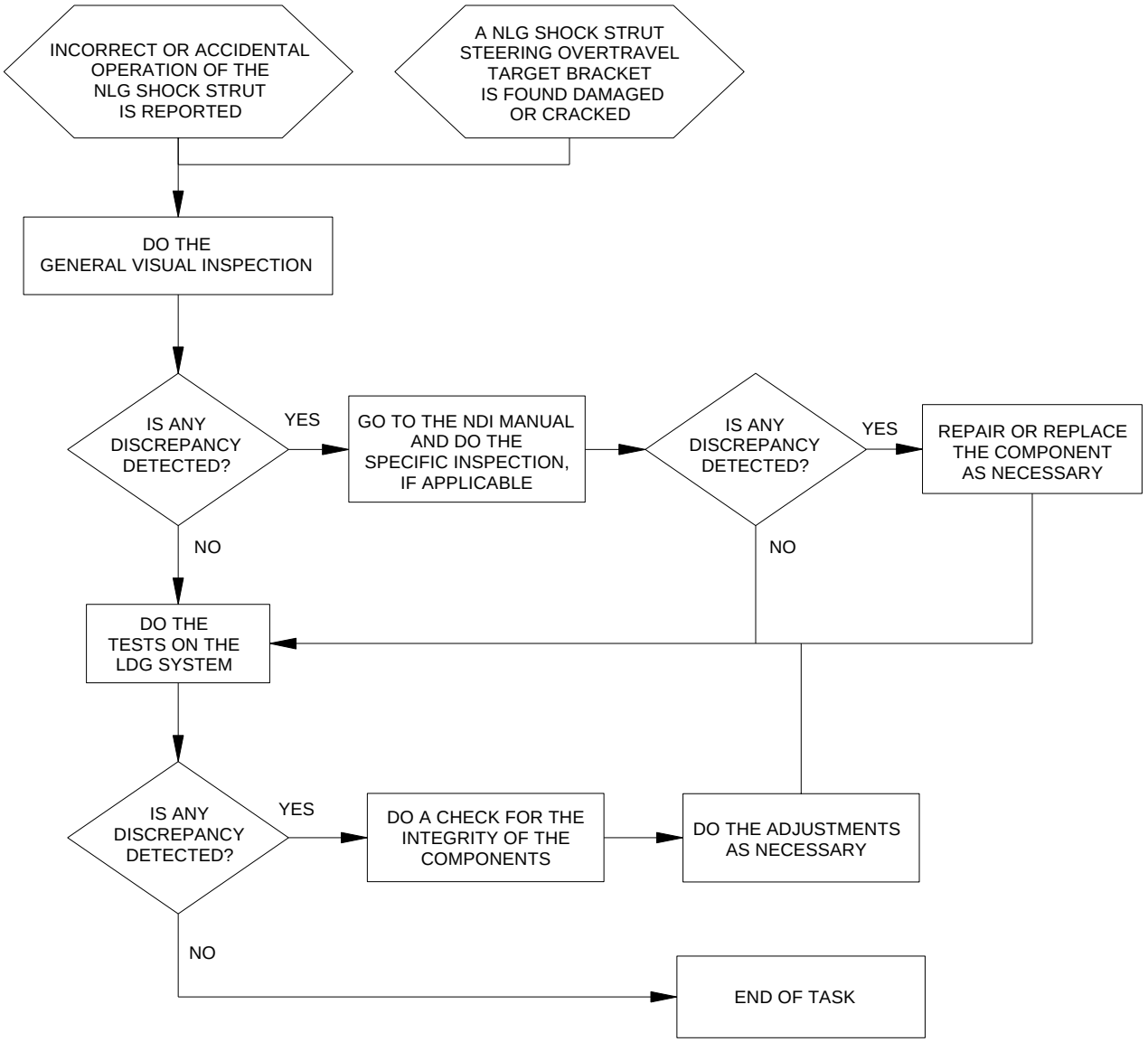
(8) Do the procedure to put the aircraft back to its initial condition (AMM TASK 20-00-00-910-801-A/200).

CAUTION: EXAMINE ALL THE WORK AREAS TO MAKE SURE THAT YOU REMOVED ALL TOOLS AND EQUIPMENT AFTER YOU COMPLETED THE WORK. IF YOU DO NOT OBEY THIS PROCEDURE, DAMAGE TO THE AIRCRAFT CAN OCCUR.

(9) Remove all tools, equipment and unwanted materials from the work area.

EFFECTIVITY: ALL

NLG Shock Strut Steering Overtravel - Flowchart
Figure 601



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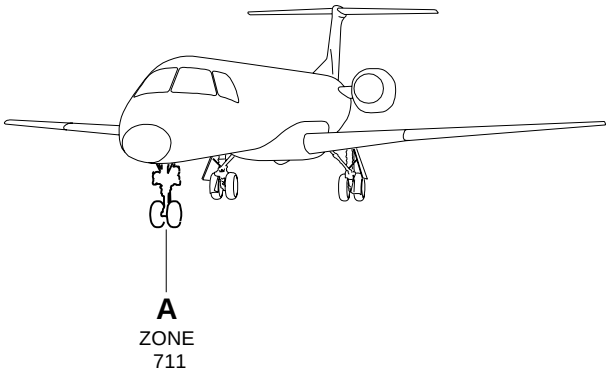
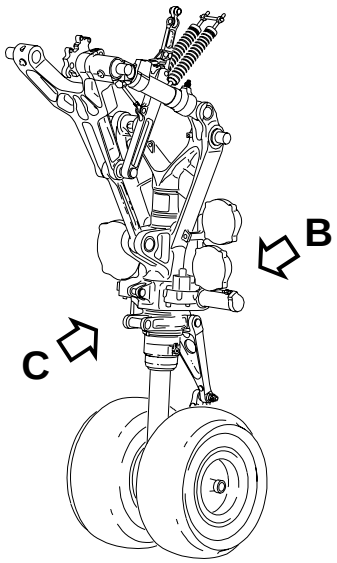
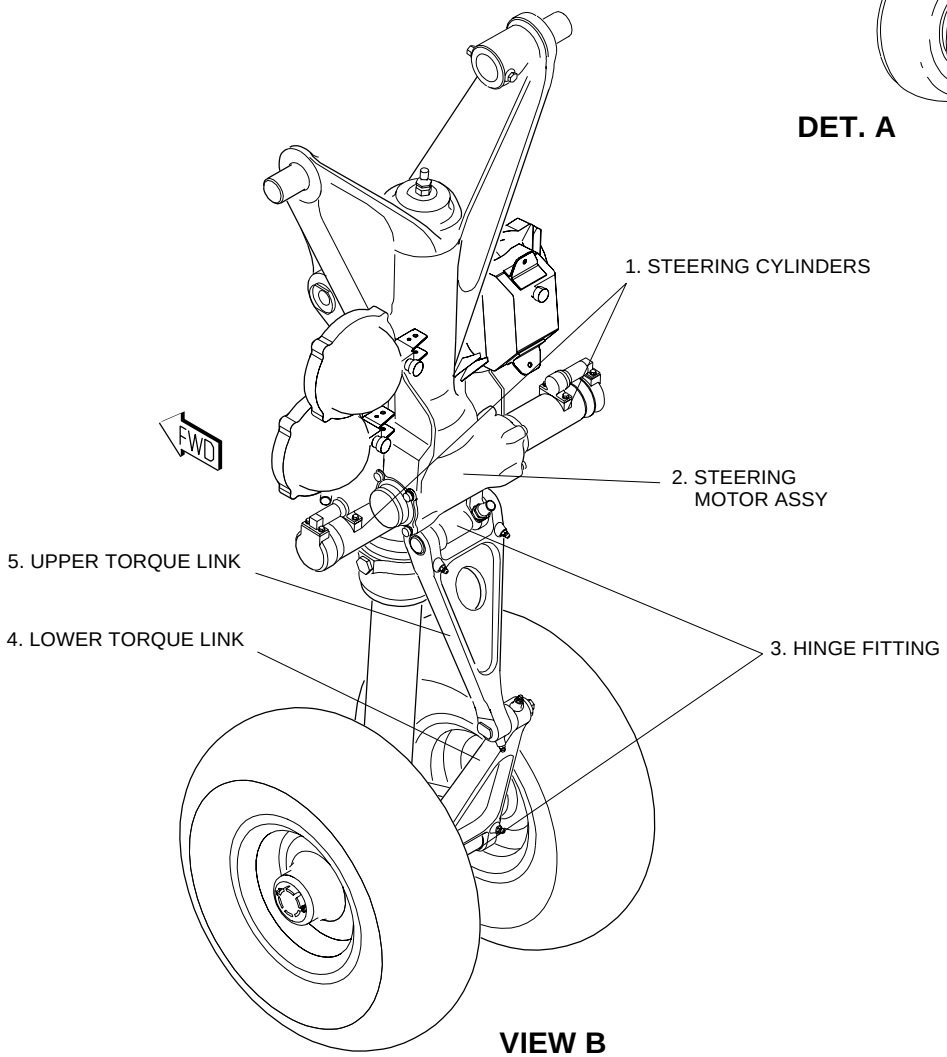
EFFECTIVITY: ALL

NLG Shock Strut Assy - Steering Overtravel General Visual Inspection
Figure 602 - Sheet 1





DET. A



VIEW B

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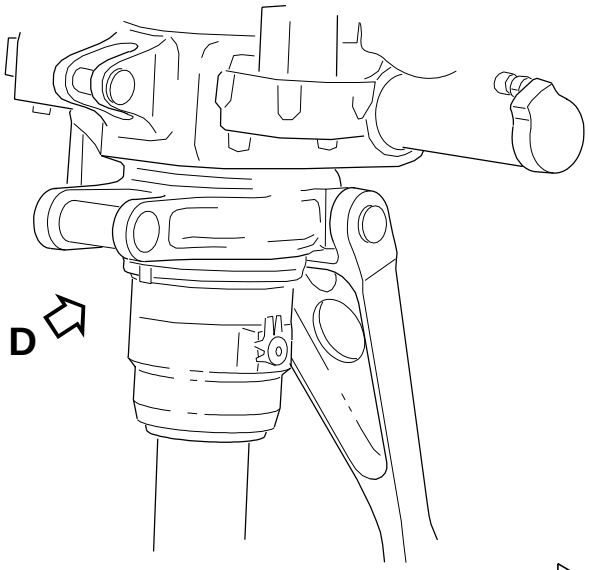
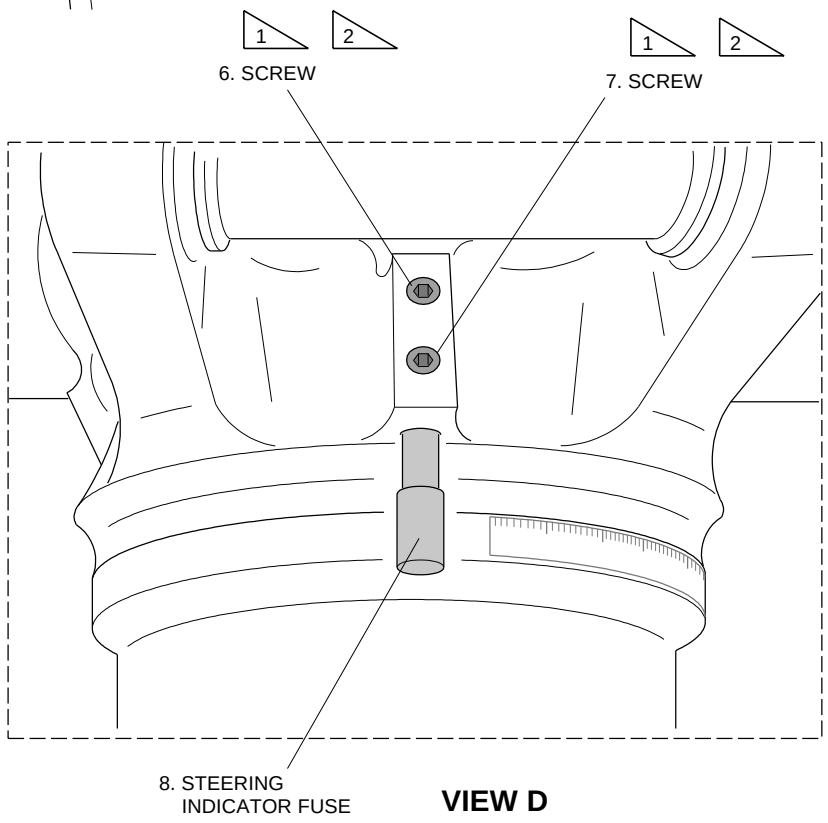
EFFECTIVITY: ALL

NLG Shock Strut Assy - Steering Overtravel General Visual Inspection
Figure 602 - Sheet 2



VIEW C



VIEW D

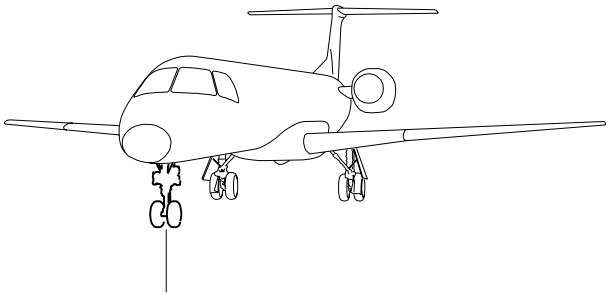
1 TORQUE: 3.0 − 4.0 N.m (27 − 35 lb.in)

2 SEALANT

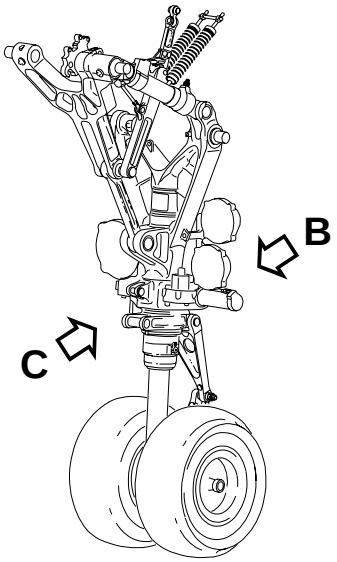
EM145AMM050906A.DGN

EFFECTIVITY: ALL

NLG Shock Strut Assy - Steering Overtravel General Visual Inspection
Figure 603 - Sheet 1



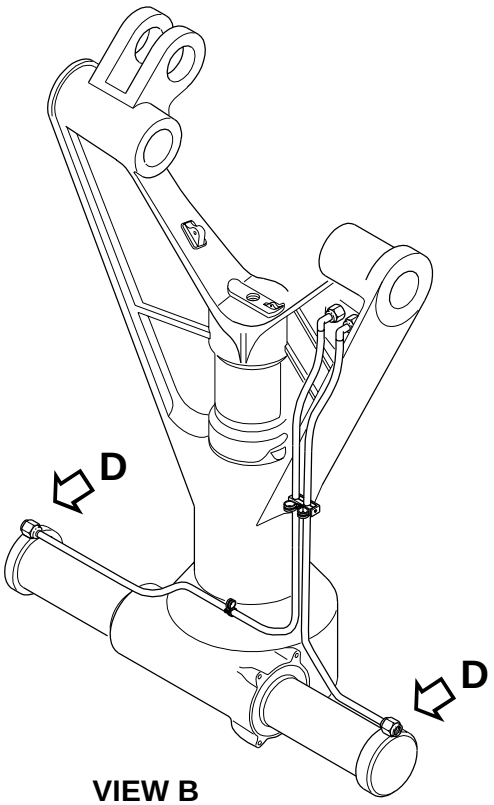
A
ZONE
711



B

C

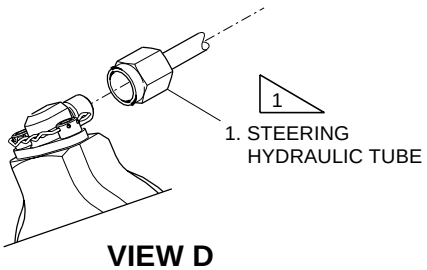
DET. A



D

D

VIEW B



1

1. STEERING
HYDRAULIC TUBE

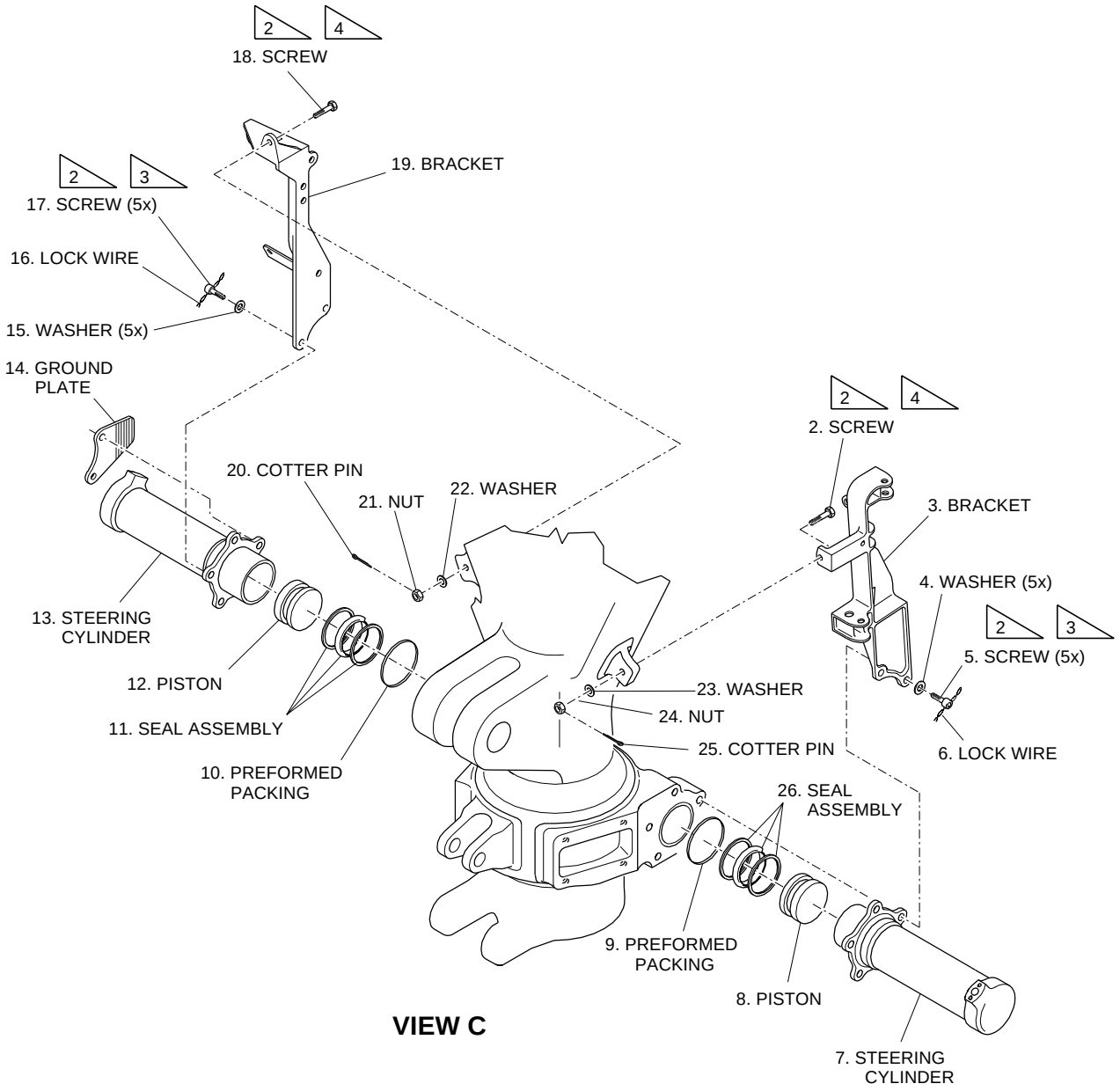
VIEW D
(TYPICAL)

1 TORQUE: 10.0 – 14.0 N.m (89 – 124 lb.in)

EM145AMM050905A.DGN

EFFECTIVITY: ALL

NLG Shock Strut Assy - Steering Overtravel General Visual Inspection
Figure 603 - Sheet 2



VIEW C

2 SEALANT

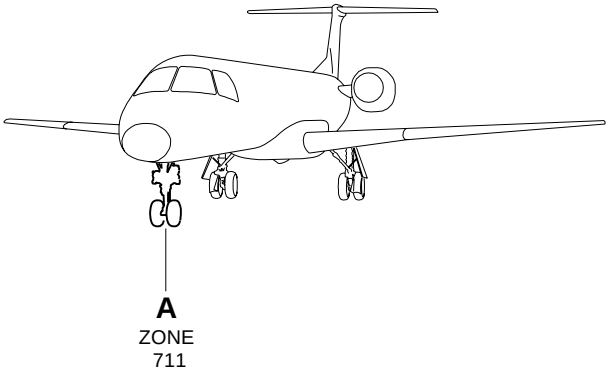
3 TORQUE: 12.0 − 14.0 N.m (106 − 124 lb.in)

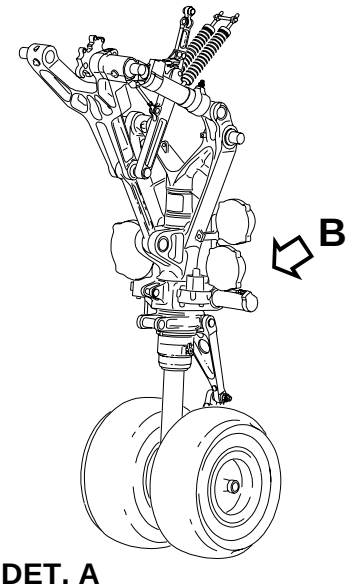
4 TORQUE: 6.0 − 7.5 N.m (53 − 66 lb.in)

EM145AMM050904A.DGN

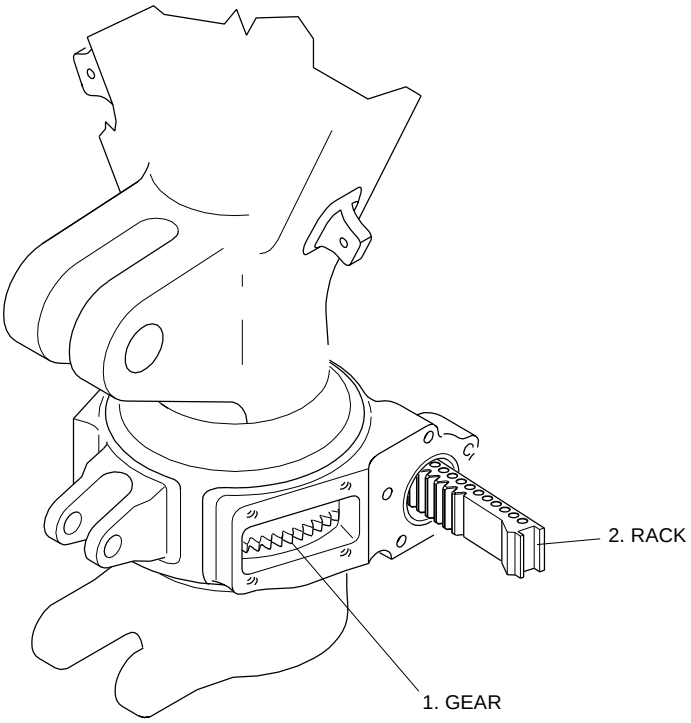
EFFECTIVITY: ALL

NLG Shock Strut Assy - Steering Overtravel General Visual Inspection
Figure 604





DET. A



VIEW B

EM145AMM320658A.DGN