



EMB145 – EMB135

AIRCRAFT
MAINTENANCE MANUAL

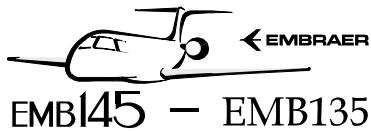
HARD LANDING - INSPECTION/CHECK

EFFECTIVITY: ALL

1. General

- A. A hard landing inspection is necessary after a non-normal landing condition, when the loads can be outside the design limit envelope. This envelope includes a combination of aircraft weight, vertical CG acceleration at touchdown, and ambient temperature.
- B. This tasks accounts for:
 - (1) Hard Landing - is an exceedance of the vertical CG acceleration threshold;
 - (2) Off-envelope Landing - is an exceedance of the ambient temperature limit.
- C. In case of overweight landing, refer to [AMM TASK 05-50-25-200-801-A/600](#).
- D. A hard landing inspection is necessary when: the crew members report on the aircraft technical Log Book that they think that a hard landing occurred; or when the analysis of the flight operation data shows that the envelope of landing parameters was not obeyed.
- E. Although, for the regulation, the sink rate parameter will define a hard landing, the data acquisition system does not give accurate data for you to use this parameter to define a hard landing. Thus, the procedures that follow use the vertical CG acceleration (for MLG hard landing detection) and the pitch rate (for NLG hard landing detection).
- F. 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
05-50-02-200-801-A	HARD LANDING	ALL



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TASK 05-50-02-200-801-A

EFFECTIVITY: ALL

2. HARD LANDING

A. General

- (1) Refer to [Figure 601](#). The flowchart is a summary of the necessary actions when the crew reports that a possible hard landing occurred or when the analysis of flight data shows that a hard landing occurred.

- (2) When the crew reports, in the Log Book, that a hard landing occurred, do the Phase-I inspection immediately. If you find no incorrect condition during the Phase-I inspection, a fly-by of 10 FC (Flight Cycles) not longer than 10 FH (Flight Hours) is permitted. Then you can do one of these two procedures:

- (a) During the fly-by period, do the Phase-II inspection. In this case, no FDR data analysis is necessary. It will be necessary to do the Phase-III inspection only if you find an incorrect condition during the Phase-II inspection.

NOTE: Because the FDR data were not analyzed, you do not know which landing gear had a hard landing. Thus, do the Phase-II inspections on the NLG and on the MLG.

- (b) During the fly-by period, obey the instructions contained in this section to analyze the FDR data. The Phase-II inspection must then be done only if the data analysis shows that the landing conditions do not obey the threshold limits given in this section for the MLG or NLG touchdown. The Phase-III inspection will be done only if you find an incorrect condition during the Phase-II inspection.

NOTE:

- The FDR data download must be done within a maximum of 20FH. If not, the data can be missed due to the recording time of the FDR.
- The flight data analysis of only one FDR is enough to define whether or not a hard landing has occurred.
- FDR is installed in the RH rear fuselage. Open the access door 272DR (AMM MPP 06-41-01/100).

- (3) When the source for you to find a hard-landing condition is the flight data analysis, not a crew report, the you must do the required inspections as per [Figure 601](#) flow chart. The Phase-III inspection will only be necessary if you find an unsatisfactory condition during the Phase-II inspection.

NOTE:

- If it is not possible to do Phase-II inspection immediately, a fly-by of 10 FC is granted from the moment of the hard landing detection through the FDR data analysis, provided that the Phase-I inspection is performed immediately and no damage is found during this inspection.

- If any discrepancy is found during the Phase-I inspection, the Phase-II inspection must be done immediately.
- During the fly-by period, the Phase-II inspection must be done.

- (4) Do the analysis of the hard landing separately for the MLG and the NLG. Main-landing gear hard touchdown is a result of a high vertical CG acceleration at the MLG touchdown. The NLG hard touchdown can occur because of a high pitch rate when the nose landing gear touches the runway.
- (5) When the crew reports that it thinks that there was a possible hard landing, do the analysis for the MLG and for the NLG.
- (6) Once the hard landing analysis is done separately for the MLG and NLG, the respective inspections that will be necessary also are different, depending on which landing gear was submitted to a hard landing.
- (7) For the analysis for hard landing, these parameters from the FDR data are necessary ([AMM TASK 31-31-00-700-803-A/500](#)):
 - Vertical CG acceleration (normal acceleration)
 - Pitch angle
 - Air/Ground indication
 - Time (GMT)
 - Date
 - Flight number
- (8) If a landing was done out of the temperature envelope, the MLG and NLG hard landing detection procedures are not applicable. Then, go directly to the Phase-II inspection. Do the Phase-III inspection if you find an incorrect condition during the Phase-II inspection.
- (9) The procedures that we give you here are conservative. Their function is to permit you to find a hard-landing condition and put the related aircraft in a serviceable condition. If you will not do a Phase-III inspection, it is not necessary to send data to Embraer. But, if you must do a Phase-III inspection, send the data to Embraer for analysis (FDR data and a report of the damage found). The decision to put the aircraft back into service will then be made by Embraer together with you.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-21-00/100	-
AMM MPP 06-41-01/100	-
AMM MPP 06-44-00/100	- COMPONENT LOCATION
AMM MPP 49-00-00/200	- MAINTENANCE PRACTICES
AMM MPP 49-02-00/200	- MAINTENANCE PRACTICES
AMM TASK 05-50-16-200-801-A/600	HIGH ENERGY STOP - INSPECTION
AMM TASK 25-51-01-000-801-A/400	BAGGAGE COMPARTMENT LINING - REMOVAL
AMM TASK 25-51-01-200-801-A/600	BAGGAGE COMPARTMENT LINING - VISUAL INSPECTION
AMM TASK 25-51-01-400-801-A/400	BAGGAGE COMPARTMENT LINING - INSTALLATION
AMM TASK 25-81-01-000-801-A/400	-



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(Continued)

REFERENCE	DESIGNATION
AMM TASK 25-81-01-000-802-A/400	-
AMM TASK 25-81-01-400-801-A/400	-
AMM TASK 25-81-01-400-802-A/400	-
AMM TASK 27-11-00-700-801-A/500	AILERON PRIMARY-MECHANICAL CONTROL BACKLASH - FUNCTIONAL CHECK
AMM TASK 27-11-01-700-801-A/500	-
AMM TASK 27-11-01-700-802-A/500	-
AMM TASK 27-21-01-700-801-A/500	-
AMM TASK 27-21-01-700-802-A/500	-
AMM TASK 27-22-00-700-801-A/500	-
AMM TASK 27-31-00-700-801-A/500	ELEVATOR PRIMARY MECHANICAL CONTROL BACKLASH - FUNCTIONAL CHECK
AMM TASK 27-31-01-700-801-A/500	TENSION OF THE ELEVATOR CONTROL CABLES - FUNCTIONAL CHECK
AMM TASK 27-31-01-700-802-A/500	TENSION OF THE ELEVATOR AUTOPILOT-SERVO CABLES
AMM TASK 27-40-00-700-801-A/500	HORIZONTAL STABILIZER BACKLASH - FUNCTIONAL CHECK
AMM TASK 31-31-00-700-803-A/500	FDR DATA - PERSONAL COMPUTER DOWNLOADING
AMM TASK 32-00-01-910-801-A/200	LG SAFETY PIN - INSTALLATION AND REMOVAL
AMM TASK 32-10-00-200-801-A/600	MLG DOORS - INSPECTION
AMM TASK 32-10-02-200-801-A/600	MLG SHOCK ABSORBER - INSPECTION
AMM TASK 32-34-00-700-801-A/500	LG EMERGENCY EXTENSION - OPERATIONAL AND FUNCTIONAL CHECKS
AMM TASK 32-49-03-200-801-A/600	BRAKE ASSEMBLY - INSPECTION
AMM TASK 51-50-01-820-801-A/200	-
AMM TASK 52-21-00-000-801-A/400	PASSENGER-CABIN ESCAPE HATCHES - REMOVAL
AMM TASK 52-21-00-400-801-A/400	PASSENGER-CABIN ESCAPE HATCHES - INSTALLATION
AMM TASK 53-04-01-000-801-A/400	FORWARD WING-TO-FUSELAGE FAIRING - REMOVAL
AMM TASK 53-04-01-400-801-A/400	FWD WING-TO-FUSELAGE FAIRING - INSTALLATION
AMM TASK 53-04-10-000-801-A/400	CENTER WING-TO-FUSELAGE FAIRING - REMOVAL
AMM TASK 53-04-10-400-801-A/400	CENTER WING-TO-FUSELAGE FAIRING - INSTALLATION
AMM TASK 53-04-20-000-801-A/400	LATERAL WING-TO-FUSELAGE FAIRING - REMOVAL
AMM TASK 53-04-20-400-801-A/400	LATERAL WING-TO-FUSELAGE FAIRING - INSTALLATION
AMM TASK 53-04-30-000-801-A/400	-
AMM TASK 53-04-30-400-801-A/400	-
AMM TASK 71-11-01-000-801-A/400	ENGINE UPPER COWLING - REMOVAL

(Continued)

<i>REFERENCE</i>	<i>DESIGNATION</i>
AMM TASK 71-11-01-400-801-A/400	ENGINE UPPER COWLING - INSTALLATION
AMM TASK 71-12-01-000-802-A/400	ENGINE LOWER COWLING - REMOVAL
AMM TASK 71-12-01-400-802-A/400	ENGINE LOWER COWLING - INSTALLATION
BF Goodrich 32-49-02	-

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

<i>QTY</i>	<i>FUNCTION</i>	<i>PLACE</i>
5	Do the task	AR

I. MLG Hard Landing Detection

SUBTASK 200-002-A

- (1) In the FDR data, record the maximum value of vertical CG acceleration in a range that starts 10 seconds before the first transition of the Air/Ground parameter from "Air" to "Ground". Use as a reference to select the 10 seconds the time of the first "ground" recorded for the Air/Ground parameter ([Figure 604](#)).

- (2) Get the aircraft mass at landing.

NOTE:

- A satisfactory procedure to have an estimate of the aircraft mass at the landing can be used.
- When it is not possible to make an estimate of the aircraft mass at landing, use, in a conservative approach, the aircraft mass at the take-off.

- (3) With the two parameters (Maximum CG acceleration and aircraft mass), refer to [Figure 602](#) to know if a hard landing occurred.
- (4) If the vertical CG acceleration peak recorded by the FDR at the MLG touchdown is not higher than the vertical CG acceleration permitted for the aircraft mass, no other action is necessary and the aircraft can be put back into service.



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- (5) If the vertical CG acceleration peak recorded by the FDR at the MLG touchdown is higher than the vertical CG acceleration permitted for the aircraft mass, do the MLG Phase-II inspection.
- (6) If you find no incorrect condition during the MLG Phase-II inspection, no other action is necessary and you can put the aircraft back into service. If you find an incorrect condition during the MLG Phase-II inspection, do the MLG Phase-III inspection and send Embraer these data:
 - (a) FDR data that contain the hard landing incident;
 - (b) Report of the incorrect conditions that you found during the preceding inspections.

NOTE: When you do a Phase-III inspection on an aircraft, send Embraer the flight data and a report of the damage that you found. You and Embraer together will then make the decision to put the aircraft back into service.

J. NLG Hard-Landing Detection

SUBTASK 200-003-A

- (1) Mark the initial and the final data samples to specify the range of pitch data for analysis:
 - (a) The range starts at the first sample for which the pitch angle is lower than 2.5 degrees, after the maximum vertical-CG acceleration recorded in the 10-second interval used for MLG hard-landing detection. Refer to [Figure 604](#).
 - (b) The range stops 2 seconds after the first negative pitch angle, after the transition of the "Air/Ground" parameter to "Ground". Refer to [Figure 604](#).
- (2) Get the pitch rates as shown in [Figure 605](#).
- (3) Compare the maximum pitch rate got with the threshold values of this table:

Table 601 - PITCH RATE THRESHOLD

Aircraft Model	Pitch rate threshold (Degrees per second)
EMB-145 (all versions)	- 5.0
EMB-135ER/LR	- 6.0

- (4) If the maximum pitch rate that you got is not more than the permitted threshold, no other action is necessary. Then put the aircraft back into service.
- (5) If the maximum pitch rate that you got is more than the threshold, do the NLG Phase-II inspection.
- (6) If you find no incorrect condition during the NLG Phase-II inspection, no other action is necessary. Then put the aircraft back into service. If you find an incorrect condition during the NLG Phase-II inspection, do the NLG Phase-III inspection and send Embraer these data:
 - (a) FDR data that contain the hard landing incident;

- (b) Report of the incorrect conditions that you found during the preceding inspections.

NOTE: When you do a Phase-III inspection on an aircraft, send Embraer the flight data and a report of the damage that you found. You and Embraer together will then make the decision to put the aircraft back into service.

K. Preparation

SUBTASK 841-002-A

- (1) Make sure that the landing gear safety pins are installed to the main and nose landing gears ([AMM TASK 32-00-01-910-801-A/200](#)).
- (2) Make sure that aileron hydraulic systems I and II and rudder hydraulic systems I and II are off.
- (3) Make sure that the gust lock is disconnected.

L. MLG Phase-I Inspection

SUBTASK 212-002-A

- (1) Examine the tires for damage.
- (2) Open access panel 193AL (AMM MPP 06-41-01/100) (AMM TASK 53-04-30-000-801-A/400) and do an inspection in the region adjacent to the wing stub ([Figure 607](#), Sheet 1).
- (3) Examine the fuselage skin and stringers and look for:
 - Missing or pulled rivets;
 - Signs of deformation;
 - Cracks.
- (4) Open access panels 191EL and 191FR (AMM MPP 06-41-01/100) ([AMM TASK 53-04-01-000-801-A/400](#)), 511AL and 611AR (AMM MPP 06-44-00/100) and do an inspection in the region adjacent to the wing stub ([Figure 607](#), Sheet 2).
- (5) Examine the fuselage skin and stringers and look for:
 - Missing or pulled rivets;
 - Signs of deformation;
 - Cracks;
- (6) Do an inspection all along the wing-to-fuselage fairing contour and look for signs of deformation, dents, or damage to the painting.
- (7) Look for missing screws at the wing-to-fuselage attachment fairing.
- (8) Do an engine inspection as given in the Rolls-Royce, AE3007A Series Maintenance Manual, SUBTASK 05-50-00-210-005.

M. MLG Phase-II Inspection

SUBTASK 212-003-A

(1) MLG Inspection

- (a) If a BRAKE OVERHEAT message occurs or if one or more wheel fuse plugs were released, do a High Energy Stop inspection ([AMM TASK 05-50-16-200-801-A/600](#)).
- (b) Examine the main-landing-gear attachment fittings for distortion, flaking paint, cracks, and pulled or missing fasteners ([AMM TASK 32-10-00-200-801-A/600](#)).
- (c) Examine the main-landing-gear wheel for signs of damage (e.g., deformation, cracks, dents, etc.).
- (d) Examine the tires for damage.
- (e) Examine the main and auxiliary brace struts and support fitting for distortion and loose fasteners.
- (f) Examine the main-gear-bearing attachment bolts for signs of distortion and looseness.
- (g) Examine the shock absorber ([AMM TASK 32-10-02-200-801-A/600](#)) and the maneuvering and unlocking actuators for signs of fluid leakage. Refer to the latest revision of Component Maintenance Manual EMBRAER T.P. 145/1188 and T.P. 145/1189 to repair the MLG.
- (h) Examine the brake assembly and hoses for signs of fluid leakage.
- (i) If you find signs of contamination caused by mud, salt water, etc., disassemble and clean the related components.
- (j) Examine the main-landing-gear wheelwell for signs of fuel leaks or other fluid leaks.

(2) Fuselage Inspection

- (a) Examine the external surface of the fuselage for fuel or other fluid leaks.
- (b) Externally examine the upper and lower fuselage skin panels between frames 36 and 69 and the wing stub for buckling, distortion, flaking paint, cracks, wrinkles, and pulled or missing fasteners ([AMM MPP 06-21-00/100](#)).

For the inspection of the lower skin panels, it is necessary to remove the wing-to-fuselage fairings ([AMM TASK 53-04-01-000-801-A/400](#), [AMM TASK 53-04-10-000-801-A/400](#), [AMM TASK 53-04-20-000-801-A/400](#), and [AMM TASK 53-04-30-000-801-A/400](#)).

NOTE: If you find wrinkles in the skin panels, do a visual internal inspection on the fuselage.

- (c) Examine the wing-to-fuselage junction for signs of distortion, missing or loose fasteners, or cracks.

- (d) Examine the main and nose landing-gear doors for signs of distortion, cracks, or loose fasteners.
- (e) Examine the main door for signs of distortion and pulled or missing fasteners. To do this inspection, open and close the doors and make sure that they operate correctly.
- (f) Examine the baggage door and service the door for signs of distortion and pulled or missing fasteners. To do this inspection, open and close the doors and make sure that they operate correctly.
- (g) Examine the emergency hatch structure and its lower frame for distortion, cracks, and pulled, loose or missing fasteners. To do this inspection, remove the passenger-cabin escape hatches ([AMM TASK 52-21-00-000-801-A/400](#)).
- (h) Examine the baggage compartment lining ([AMM TASK 25-51-01-200-801-A/600](#)).

WARNING: BEFORE YOU DO THE TASK, OBEY THE SAFETY PRECAUTIONS GIVEN IN AMM MPP 49-00-00/200 OR AMM MPP 49-02-00/200, AS APPLICABLE, TO PREVENT INJURY TO PERSONS AND DAMAGE TO THE MATERIAL.

- (i) Examine the lower fuselage structure between frames 64 to 80 for signs that the runway was touched. If there are signs of damage, examine these areas (AMM MPP 06-21-00/100):
 - 1. The tail cone.
 - 2. The APU fairing.
 - 3. The APU escape duct.
- (3) Nacelle/Pylon Inspection
 - (a) Examine the upper and lower engine pylon skin panels for signs of buckling, distortion, flaking paint, wrinkles, and pulled or missing fasteners.
 - (b) Examine the engine mounts (the bolts included), yoke-to-pylon spar I/II/III/IV attachment, and spar I/II/III/IV - to-bulkhead attachments for signs of cracks, distortions, misalignments, and loose fasteners ([Figure 601](#)).
 - 1. Remove the engine upper cowling ([AMM TASK 71-11-01-000-801-A/400](#)) and engine lower cowling ([AMM TASK 71-12-01-000-802-A/400](#)) for the inspection of the upper mounts.
 - 2. Remove the baggage-compartment lining panels ([AMM TASK 25-51-01-000-801-A/400](#)) and thermoacoustic insulation blankets (AMM TASK 25-81-01-000-801-A/400 or AMM TASK 25-81-01-000-802-A/400) as applicable.
- (4) Wing Inspection
 - (a) Visually examine wing spars II and III. Start from the main-landing-gear bay. Remove the access panels and, with flap I down, also examine the lower skin adjacent to them for distortion, buckling, cracks, and loose or missing fasteners.

NOTE: It is not necessary to defuel the aircraft in this phase.

- (b) Examine the upper and lower wing skin panels for signs of fastener hole elongation, skin cracks, or loose fasteners.
- (c) Examine the external surface of the wing for leakage of fuel or other fluids.
- (5) Flight Control Inspection
 - (a) Examine all flight controls to make sure that the movements are free.
- (6) Engine Inspection:
 - (a) Do the engine inspection. Refer to Rolls-Royce Maintenance Manual CSP 34022 (TASK 05-50-00-200-805).

N. MLG Phase-III Inspection

SUBTASK 212-004-A

- (1) MLG Inspection
 - (a) Examine all bolts and pin connections in the main landing gear for signs of distortions. Also examine spars II and III for permanent buckles in the web.
 - (b) Examine the area above the main-landing-gear support attachment for buckled skin or loose rivets.
 - (c) Examine the bolts that attach the main-gear trunnion bearing for breaking and stretching.
 - (d) If it is necessary to replace the wheel because of blown tires or flat tires. After a hard landing, examine the wheel structure for cracks. An accurate inspection is necessary on the wheel that was removed (BF Goodrich 32-49-02).
 - (e) Examine the brakes for signs of damage ([AMM TASK 32-49-03-200-801-A/600](#)).
- (2) Fuselage Inspection
 - (a) Examine the fuselage external surfaces for loose or sheared rivets, structural damage, and signs of leakage of fuel and other fluids.
 - (b) Carefully examine the fuselage in the area below the floor beams in the wing center section.
 - (c) Examine the wing-to-fuselage joints and the wheelwell for cracks and other types of damage. Look for flaked paint and pulled-out or missing fasteners.
 - (d) Examine the upper fuselage structure above the wing stub for buckled structure, cracks, and flaked paint. Also look for pulled-out or missing fasteners.
- (3) Nacelle/Pylon Inspection
 - (a) Examine the engine struts and nacelle for loose or sheared rivets, structural damage, and signs of leakage of fuel and other fluids.
- (4) Wing Inspection

- (a) Examine the wing external surfaces for loose or sheared rivets, structural damage, and signs of leakage of fuel and other fluids.
 - (b) Defuel the tank and open the access panels to examine spar II for signs of cracks, flaked paint, and pulled-out or missing fasteners.
- (5) Flight Control Inspection
- (a) Inspect all flight controls for the specified cable tension (AMM TASK 27-11-01-700-801-A/500, AMM TASK 27-11-01-700-802-A/500, AMM TASK 27-21-01-700-801-A/500, AMM TASK 27-21-01-700-802-A/500, **AMM TASK 27-31-01-700-801-A/500, AMM TASK 27-31-01-700-802-A/500**).
 - (b) Do the functional check for backlash (**AMM TASK 27-11-00-700-801-A/500**, AMM TASK 27-22-00-700-801-A/500, **AMM TASK 27-31-00-700-801-A/500**, and **AMM TASK 27-40-00-700-801-A/500**).
- (6) Free-fall Operation Inspection
- (a) Examine the landing gear for free-fall system correct operation (**AMM TASK 32-34-00-700-801-A/500**).
- NOTE: • An irregular, not-smooth operation of the landing gear during the free-fall system operation can be a sign of deformation of the landing gear. It must then be examined for correct alignment.
- If a structural damage occurs, refer to the SRM.
- (7) Do the aircraft alignment (AMM TASK 51-50-01-820-801-A/200).

O. NLG Phase-I Inspection ([Figure 608](#))

SUBTASK 212-005-A

- (1) Examine the tires for damage.
- (2) Do an inspection on the fuselage skin in the NLG region.
- (3) Open access panels 113DL and 114CR and do an inspection on the internal structure.
- (4) Do an internal inspection on the structure of the nose landing-gear bay.
- (5) In all these regions, look for:
 - Missing or pulled rivets;
 - Signs of deformation;
 - Cracks;
 - Dents;
 - Damaged paint.

P. NLG Phase-II Inspection

SUBTASK 212-006-A

(1) Nose Landing-Gear Inspection

- (a) Examine the nose-landing-gear attachment fittings for distortion, flaking paint, cracks, and pulled or missing fasteners.
- (b) Examine the nose landing-gear wheel for signs of damage (e.g., deformation, cracks, dents, etc.).
- (c) Examine the tires for damage.
- (d) Examine the drag-and-locking-strut link assemblies and drag-and-locking-strut support fitting for distortion and loose fasteners.
- (e) Examine the nose-gear-strut-bearing attachment bolts for signs of distortion or loose condition.
- (f) Examine the shock absorber maneuvering and unlocking actuators for signs of fluid leakage.
- (g) If signs of contamination caused by mud, salt water, etc. are found, disassemble and clean the related components.
- (h) Examine the nose landing-gear wheelwell for signs of leakage of fluids.

Q. NLG Phase-III Inspection

SUBTASK 212-007-A

- (1) Examine the nose landing-gear wheelwell for buckled structure. Also examine the fuselage skin attachments above the landing gear beam for distortion. Look for cracks, flaked paint, and pulled-out or missing fasteners.

R. Follow-on

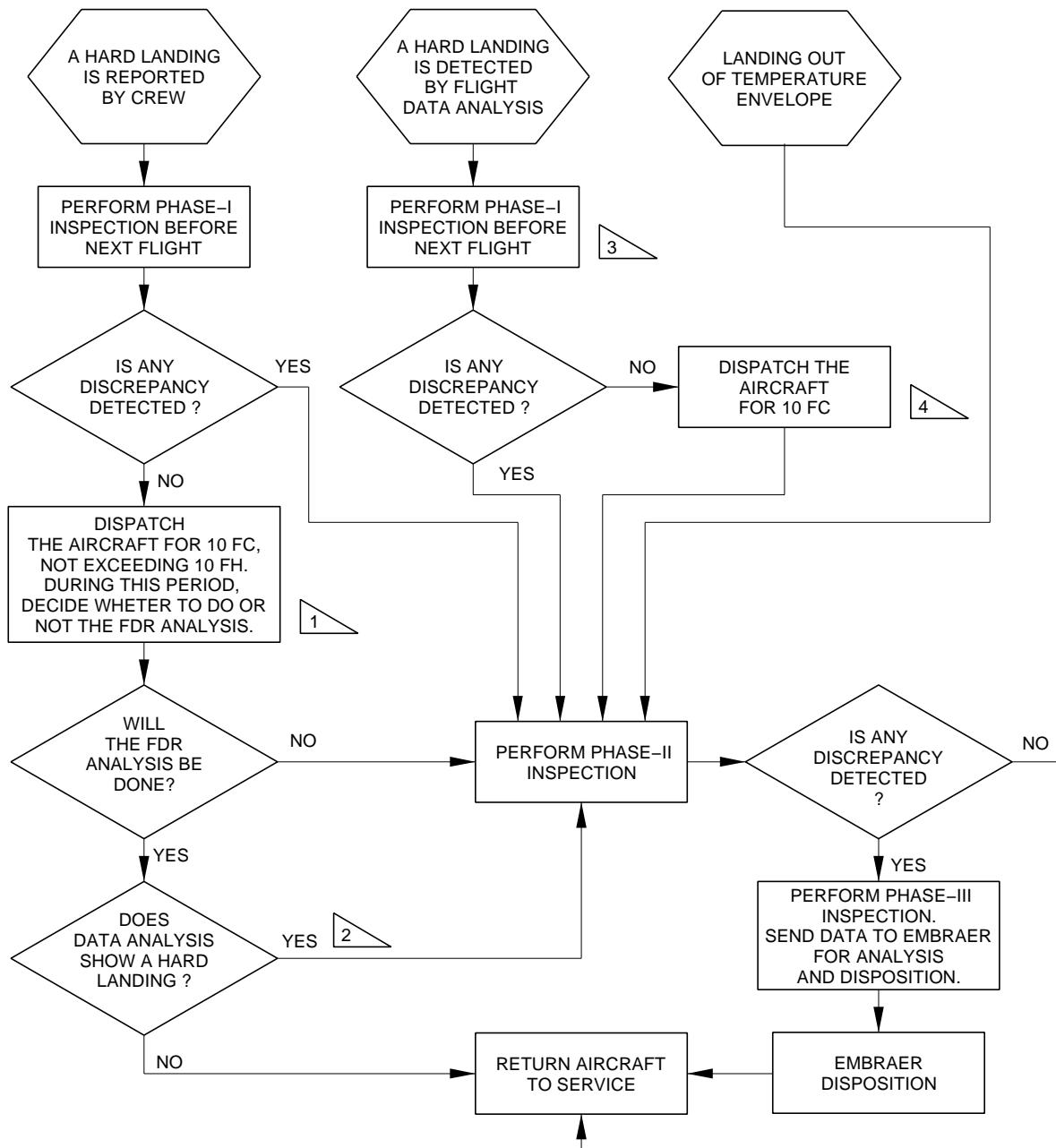
SUBTASK 842-002-A

- (1) **NOTE:** Install the panels or other items that you possibly removed to do the inspection.
Install the wing-to-fuselage fairings ([AMM TASK 53-04-01-400-801-A/400](#), [AMM TASK 53-04-10-400-801-A/400](#), [AMM TASK 53-04-20-400-801-A/400](#), and [AMM TASK 53-04-30-400-801-A/400](#)).
- (2) Install the passenger-cabin escape hatches ([AMM TASK 52-21-00-400-801-A/400](#)).
- (3) Install the engine upper cowling ([AMM TASK 71-11-01-400-801-A/400](#)) and the engine lower cowling ([AMM TASK 71-12-01-400-802-A/400](#)).
- (4) Install the baggage-compartment lining panels ([AMM TASK 25-51-01-400-801-A/400](#)) and thermoacoustic insulation blankets (AMM TASK 25-81-01-400-801-A/400 or AMM TASK 25-81-01-400-802-A/400) as applicable.

EFFECTIVITY: ALL

Flowchart of Hard-Landing Detection and Inspection Procedures

Figure 601



1 THE FDR DATA DOWNLOAD SHALL BE PERFORMED IN A MAXIMUM OF 20FH. IF NOT, THE DATA CAN BE MISSED DUE TO THE RECORDING TIME OF THE FDR.

2 PHASE-II INSPECTION TO BE DONE WITHIN THE REMAINING 10 FC FLY-BY PERIOD.

3 FROM THE MOMENT OPERATORS IS INFORMED OF THE EVENT.

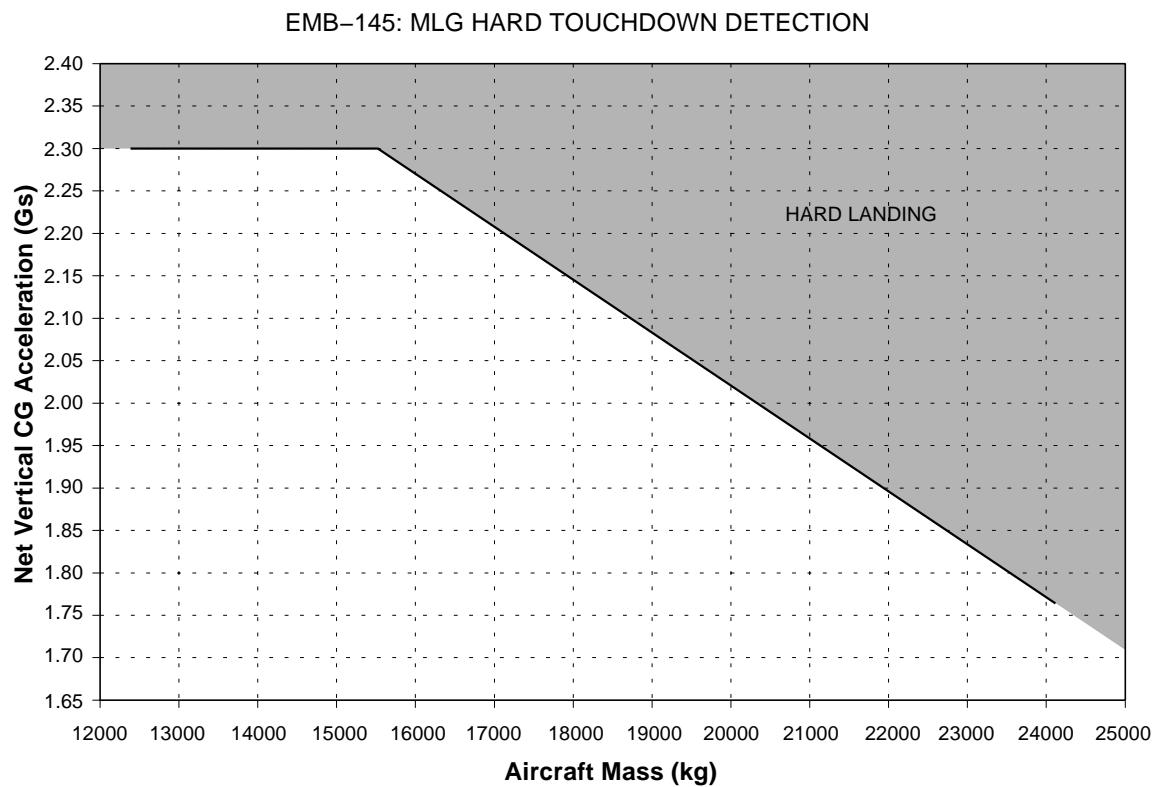
4 FROM THE DATE PHASE-I INSPECTION IS PERFORMED AND NO DAMAGE IS FOUND.

EM145AMM050668G.DGN

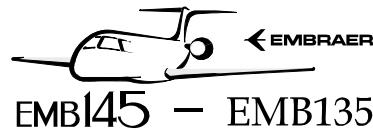
EFFECTIVITY: ALL

Net Vertical CG Acceleration Versus Aircraft Mass at Landing

Figure 602



EM145AMM050648A.DGN



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EFFECTIVITY: ALL

Vertical CG Acceleration for Hard-Landing Touchdown Detection

Figure 603

TABLE 4-1: VERTICAL CG ACCELERATION FOR HARD MLG TOUCHDOWN DETECTION

Aircraft Mass (kg)	Nz (Gs)	Aircraft Mass (kg)	Nz (Gs)	Aircraft Mass (kg)	Nz (Gs)
24100	1.7708	21100	1.9554	18100	2.1400
24000	1.7769	21000	1.9615	18000	2.1462
23900	1.7831	20900	1.9677	17900	2.1523
23800	1.7892	20800	1.9738	17800	2.1585
23700	1.7954	20700	1.9800	17700	2.1646
23600	1.8015	20600	1.9862	17600	2.1708
23500	1.8077	20500	1.9923	17500	2.1769
23400	1.8138	20400	1.9985	17400	2.1831
23300	1.8200	20300	2.0046	17300	2.1892
23200	1.8262	20200	2.0108	17200	2.1954
23100	1.8323	20100	2.0169	17100	2.2015
23000	1.8385	20000	2.0231	17000	2.2077
22900	1.8446	19900	2.0292	16900	2.2138
22800	1.8508	19800	2.0354	16800	2.2200
22700	1.8569	19700	2.0415	16700	2.2262
22600	1.8631	19600	2.0477	16600	2.2323
22500	1.8692	19500	2.0538	16500	2.2385
22400	1.8754	19400	2.0600	16400	2.2446
22300	1.8815	19300	2.0662	16300	2.2508
22200	1.8877	19200	2.0723	16200	2.2569
22100	1.8938	19100	2.0785	16100	2.2631
22000	1.9000	19000	2.0846	16000	2.2692
21900	1.9062	18900	2.0908	15900	2.2754
21800	1.9123	18800	2.0969	15800	2.2815
21700	1.9185	18700	2.1031	15700	2.2877
21600	1.9246	18600	2.1092	15600	2.2938
21500	1.9308	18500	2.1154	15500	2.3000
21400	1.9369	18400	2.1215	12400	2.3000
21300	1.9431	18300	2.1277	–	–
21200	1.9492	18200	2.1338	–	–

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EFFECTIVITY: ALL
Downloaded FDR Data
Figure 604

Time	Air/Ground indication	Pitch angle	Vertical CG acceleration	Flight number		
Sample	GMT	A/G	Pitch	NrAcc	Date	FltNbr
188776				1 . 0076		
188776		Air	4 . 84	1 . 0076		
188776				1 . 0260		
188776		Air	5 . 19	1 . 0580		
188776				1 . 0672		
188777	13 : 00 : 42	Air	5 . 54	1 . 0901		
188777				1 . 0901		
188777		Air	5 . 54	1 . 0992		
188777				1 . 0992		
188777		Air	5 . 72	1 . 0901		
188777				1 . 0580		
188777		Air	5 . 72	1 . 0672		
188777				1 . 0580		
188778	13 : 00 : 43	Air	5 . 72	1 . 0580		
188778				1 . 0580		
188778		Air	5 . 54	1 . 0992		
188778				1 . 2504		
188778		Air	5 . 28	1 . 5435		
188778				1 . 5435		
188778		Air	4 . 22	1 . 4107		
188778				0 . 9252		
188779	13 : 00 : 44	Air	2 . 81	0 . 8656		0
188779				0 . 8656		
188779		Air	1 . 23	0 . 9160		
188779				1 . 0489		
188779		Gnd	0 . 26	1 . 0489		
188779				0 . 9252		
188779		Air	- 0 . 79	0 . 9389		
188779				1 . 1496		
188780	13 : 00 : 45	Air	- 0 . 88	1 . 2183	230403	
188780				1 . 2183		
188780		Gnd	- 1 . 06	1 . 0992		
188780				0 . 9389		
188780		Gnd	- 0 . 79	0 . 9389		
188780				0 . 9893		
188780		Gnd	- 0 . 70	1 . 0076		
188780				0 . 9893		
188781	13 : 00 : 46	Gnd	- 0 . 79	0 . 9893		
188781				1 . 0168		
188781		Gnd	- 0 . 88	0 . 9481		
188781				0 . 9893		
188781		Gnd	- 0 . 79	1 . 0992		
188781				1 . 0992		
188781		Gnd	- 0 . 70	1 . 0901		
188781				0 . 9893		
188782	13 : 00 : 47	Gnd	- 0 . 70	0 . 9893		
188782				1 . 0260		
188782		Gnd	- 0 . 70	0 . 9893		

EM145AMM050650A.DGN

EFFECTIVITY: ALL
 Pitch Rate Calculation Data
 Figure 605

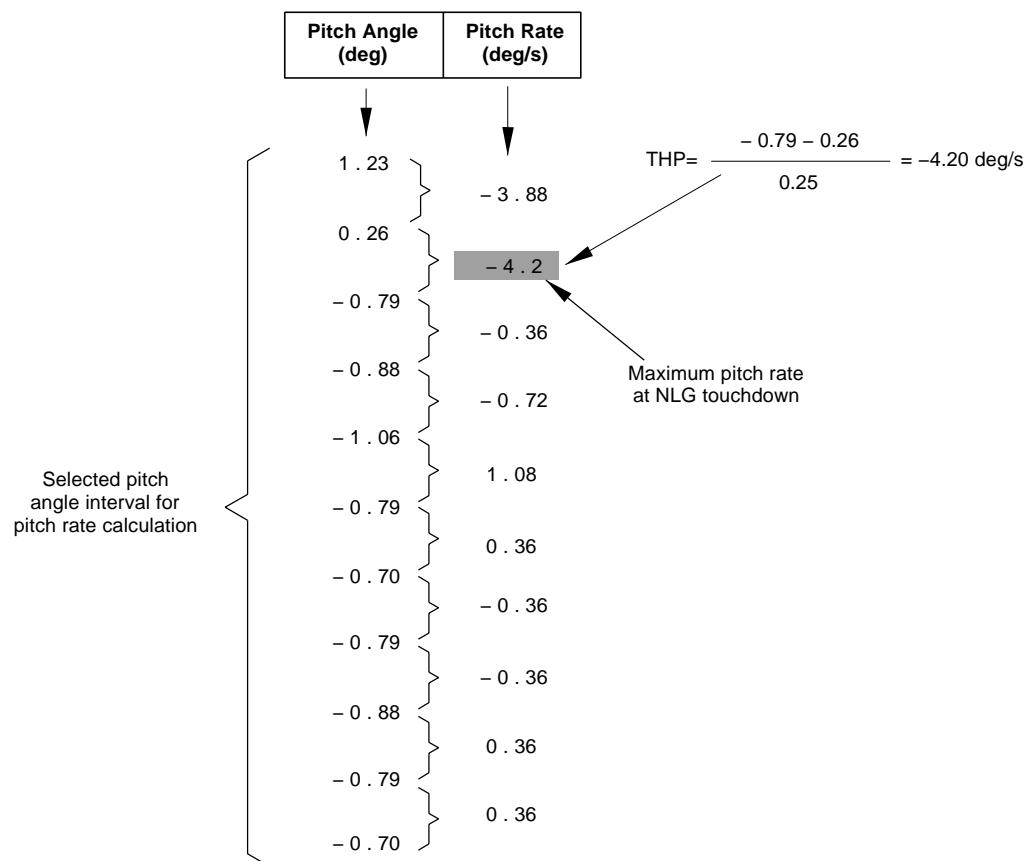
Where:

$$THP_i = \frac{TH_i - TH_{i-1}}{0.25}$$

THP_i = pitch rate at i time instant;

TH_i = pitch angle at i time instant;

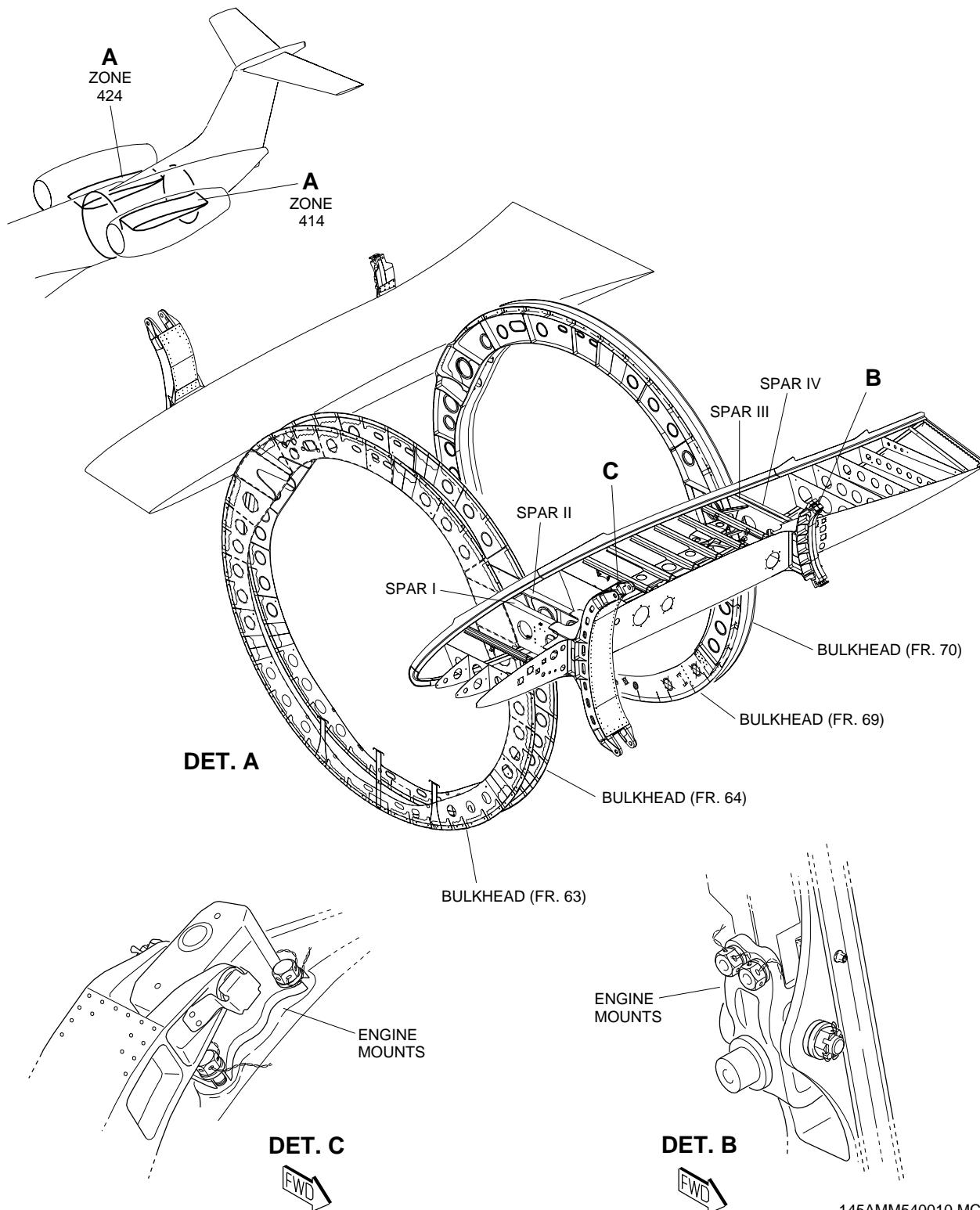
TH_{i-1} = pitch angle at i-1 time instant.



EFFECTIVITY: ALL

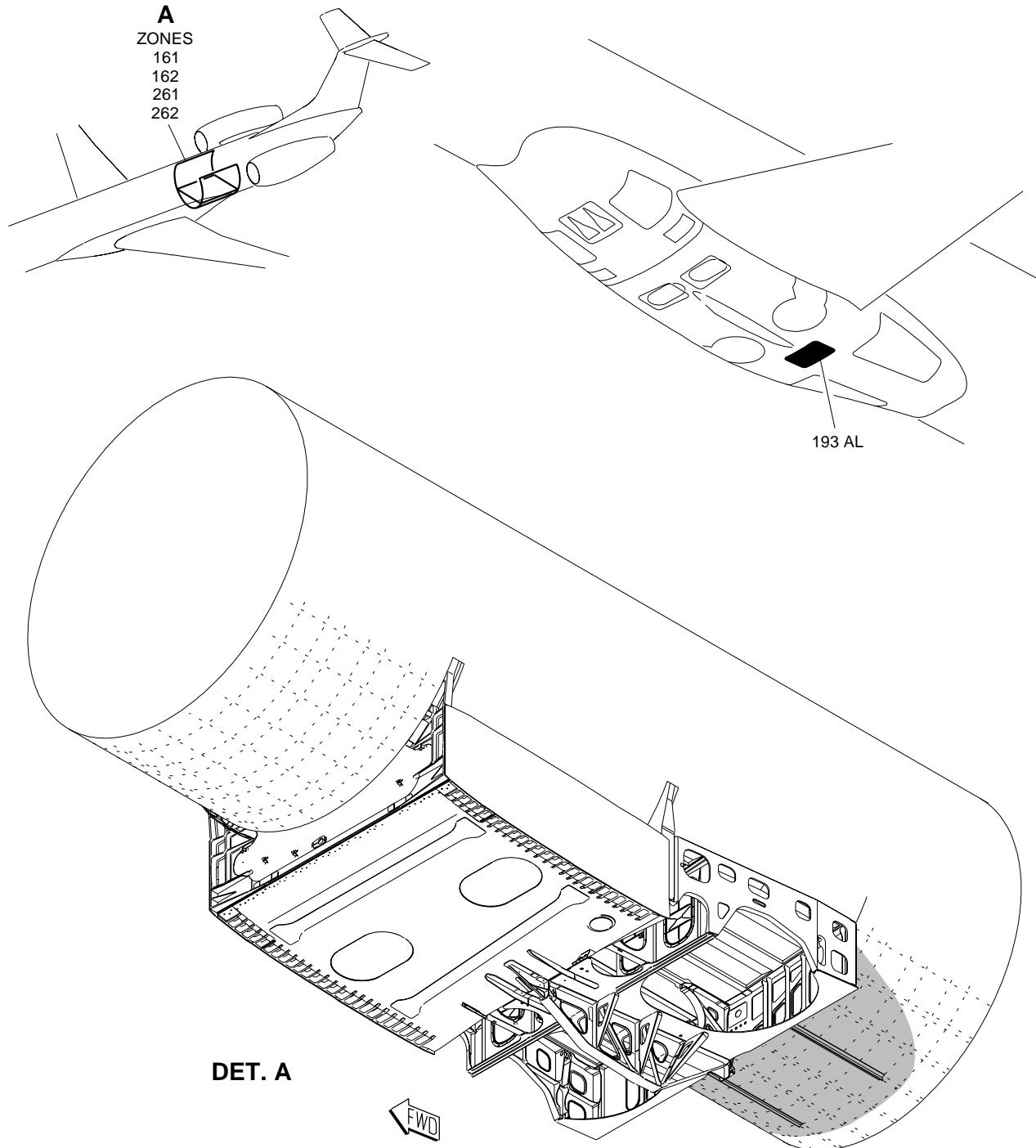
Engine Mounts, Spars, and Bulkheads

Figure 606



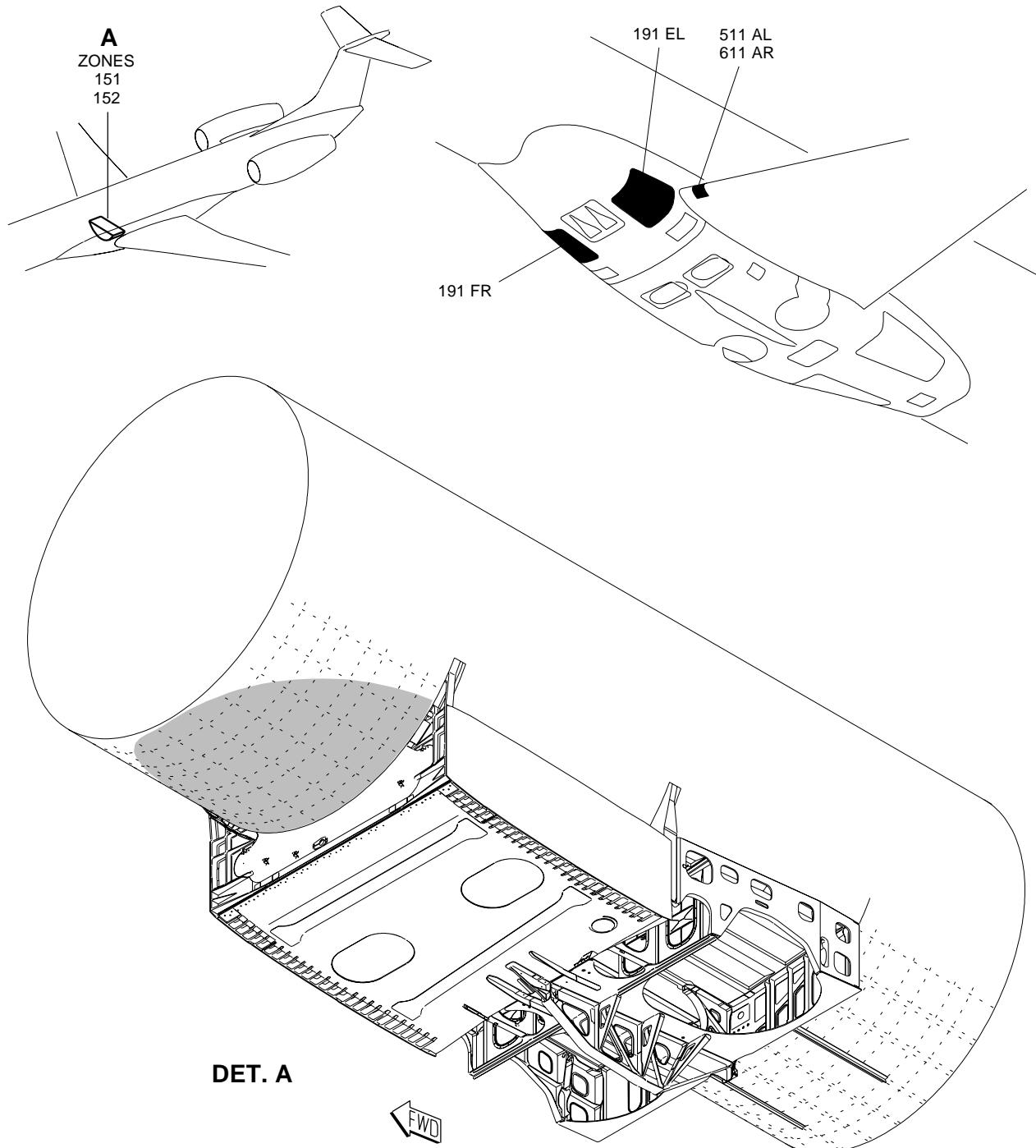
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EFFECTIVITY: ALL
MLG Phase-I Inspection
Figure 607 - Sheet 1



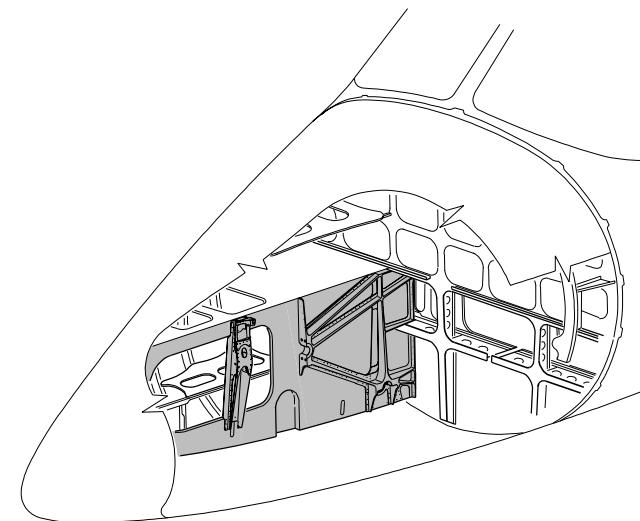
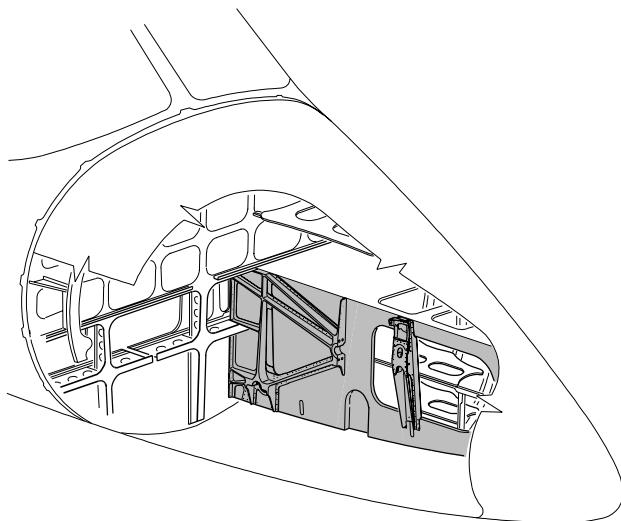
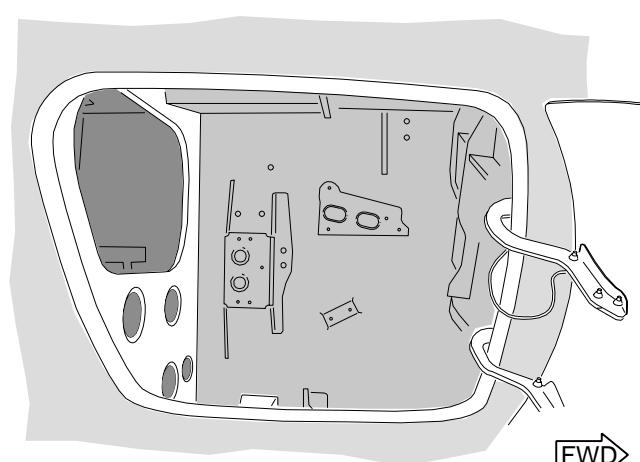
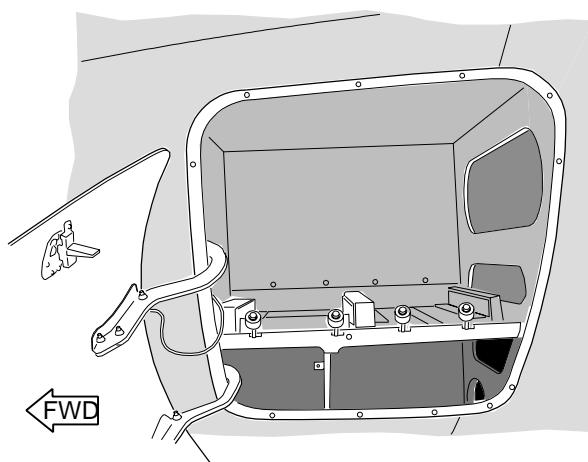
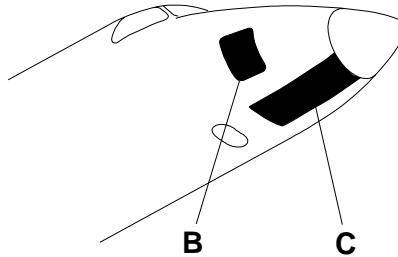
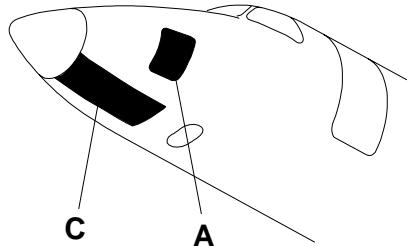
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EFFECTIVITY: ALL
MLG Phase-I Inspection
Figure 607 - Sheet 2



EM145AMM050670C.DGN

EFFECTIVITY: ALL
NLG Phase -I Inspection
Figure 608



DET. C

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