OVERWEIGHT LANDING - INSPECTION/CHECK

EFFECTIVITY: ALL

1. General

   A. An overweight landing inspection is necessary after a landing is done with the aircraft above the MLW (Maximum Landing Weight) which can cause loads out of the design limit envelope. It is necessary when the crew is not able to make sure that the SR (Sink Rate) was smaller than 6 FPS (Feet per Second).

   B. When the crew cannot make sure that the sink rate was not more than the 6 FPS limit at touchdown, this procedure permits you to use FDR data for the check of the loads in the landing against the aircraft landing envelope. For this procedure, the vertical CG acceleration is used.

   C. 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*
05-50-25-200-801-A	OVERWEIGHT LANDING	ALL

TASK 05-50-25-200-801-A
EFFECTIVITY: ALL

2. OVERWEIGHT LANDING

A. General

(1) Refer to Figure 601. The flowchart is a summary of the necessary actions when an overweight landing occurs.

(2) When the crew cannot make sure that the vertical speed was not more than the permitted limit during the touchdown, 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) is permitted. Then you can do one of these two procedures:

(a) At the end of 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.

(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 touchdown, as a function of vertical CG acceleration and aircraft weight at touchdown. The Phase-III inspection will be done only if you find an incorrect condition during the Phase-II inspection.

(3) The procedure to find an excess to the landing envelope when an overweight landing occurs and the related inspections are applicable only to the MLG. Do the hard landing inspection (AMM TASK 05-50-02-200-801-A/600) if the crew reports one of these two conditions:

- The aircraft touches the ground with the NLG first;
- The crew reports a suspect hard landing in the NLG because of high pitch angle variation.

(4) For an overweight landing analysis, these parameters from the FDR data are necessary (AMM TASK 31-31-00-700-803-A/500):

- Vertical CG acceleration (normal acceleration)
- Air/Ground indication
- Time (GMT)
- Date
- Flight number

(5) The procedures that we give you here are conservative. Their function is to permit you to find an envelope exceedance 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 49-00-00/200	- MAINTENANCE PRACTICES
AMM MPP 49-02-00/200	- MAINTENANCE PRACTICES
AMM TASK 05-50-02-200-801-A/600	HARD LANDING
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	-
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

(Continued)

REFERENCE	*DESIGNATION*
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
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

QTY	*FUNCTION*	*PLACE*
5	Do the task	AR

I. Overweight 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 603).

(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 an excess to the aircraft landing envelope 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 at touchdown, no other action is necessary and the aircraft can be put back into service.

(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 at touchdown, do the Phase-II inspection.

(6) If you find no incorrect condition during the 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 Phase-II inspection, do the Phase-III inspection and send Embraer these data:

(a) FDR data that contain the overweight 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. 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.

K. Phase-I Inspection

SUBTASK 212-002-A

(1) Examine the MLG tires for damage.

(2) Open access panel 193AL and do an inspection in the region adjacent to the wing stub (Figure 605).

(3) Examine the fuselage skin and stringers and look for:

- Missing or pulled rivets;
- Signs of deformation;
- Cracks.

(4) Open access panels 191FR and 191EL and do an inspection in the region adjacent to the wing stub. Also remove the landing light lenses (511AL and 611AR) to get access to do the inspection in this area. (Figure 605).

(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.

L. 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 604).

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).

M. Phase-III Inspection

SUBTASK 212-004-A

(1) MLG Inspection

(a) Examine all bolts and pin connections at 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 an overweight 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).

N. 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).

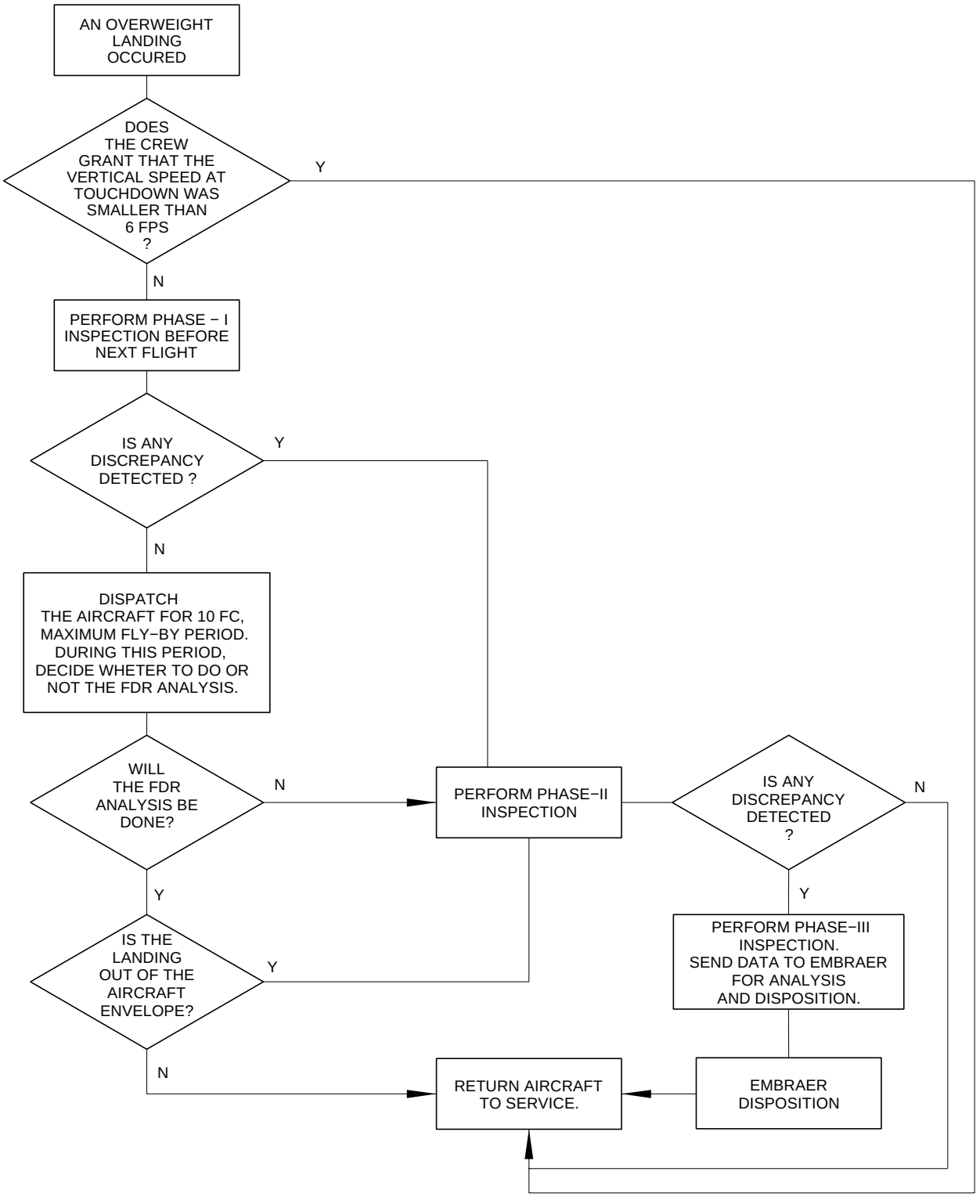
(2) Install the passenger-cabin escape hatches (AMM TASK 52-21-00-400-801-A/400).

(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 Overweight Landing Analysis and Inspection Procedures
Figure 601



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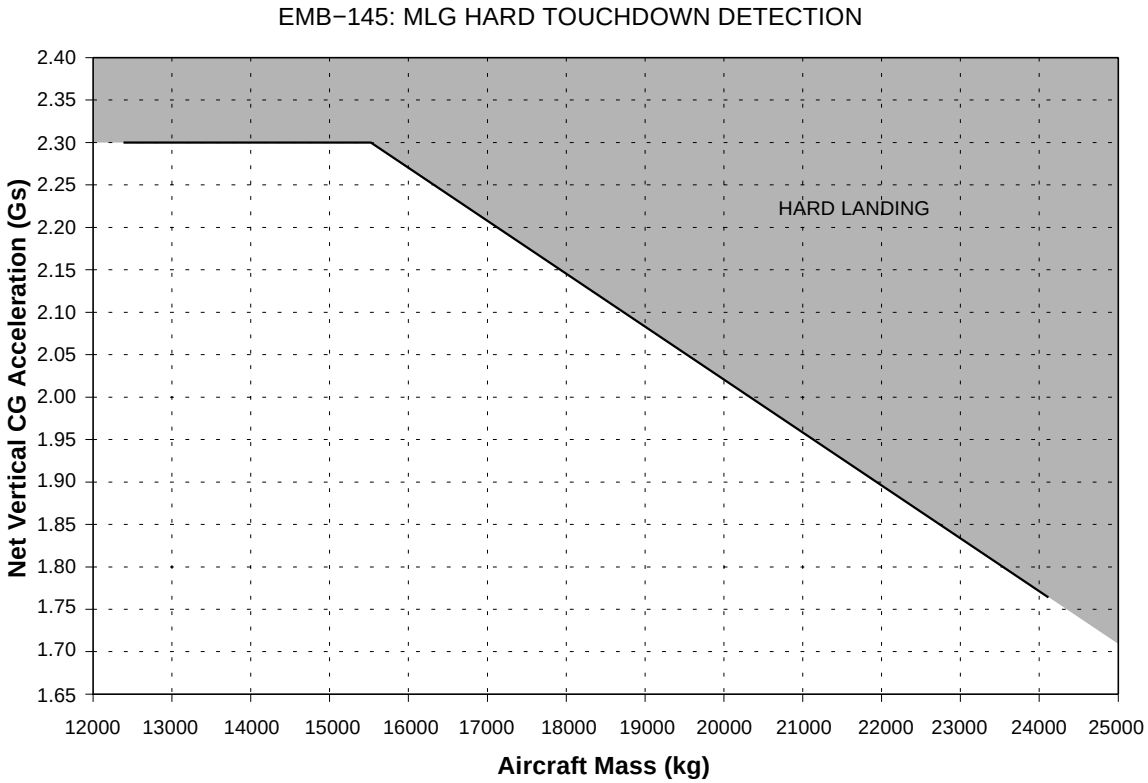
EFFECTIVITY: ALL

Vertical CG Acceleration Versus Aircraft Mass at Landing
Figure 602



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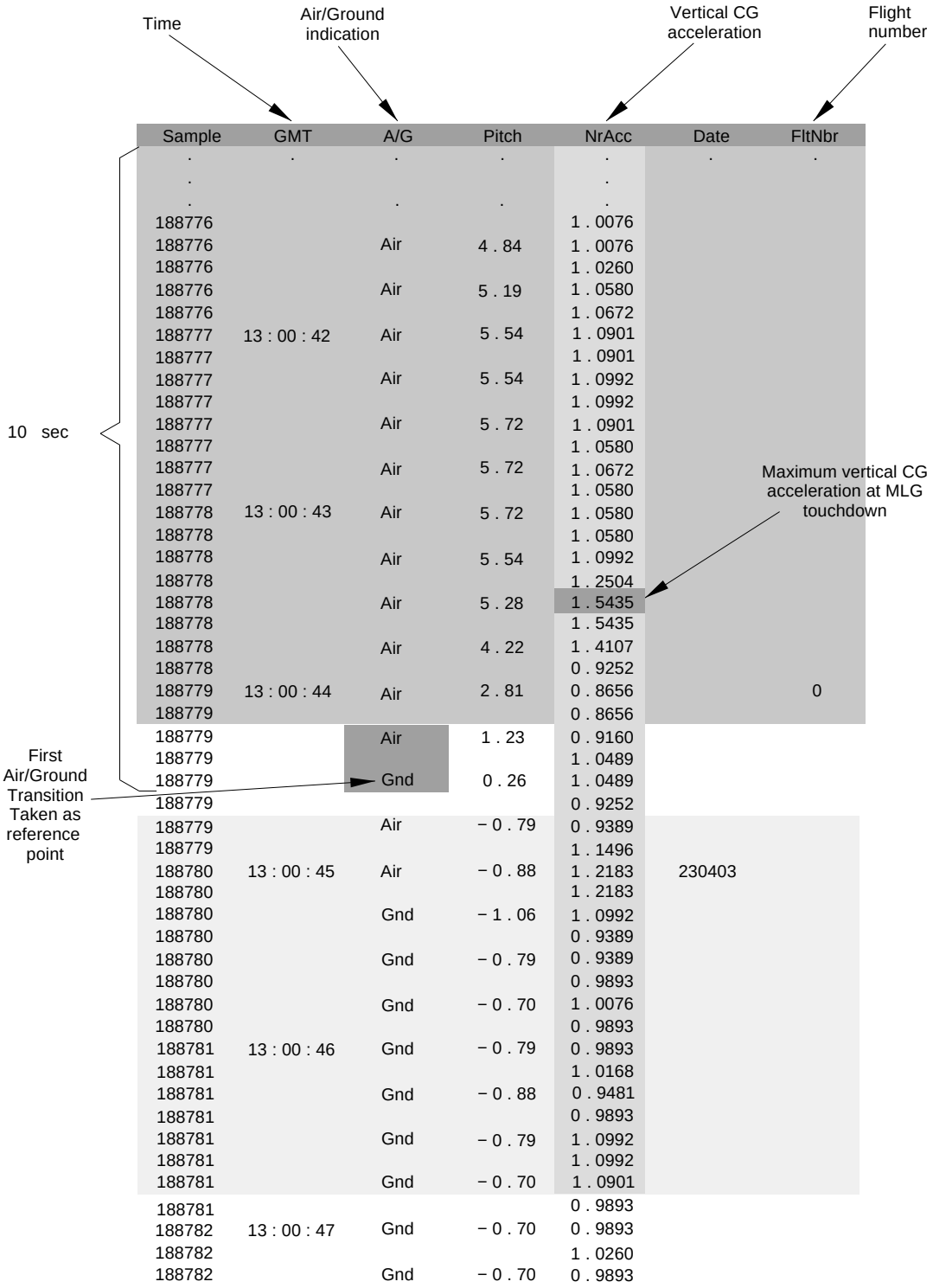
EFFECTIVITY: ALL

Downloaded FDR Data
Figure 603



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		

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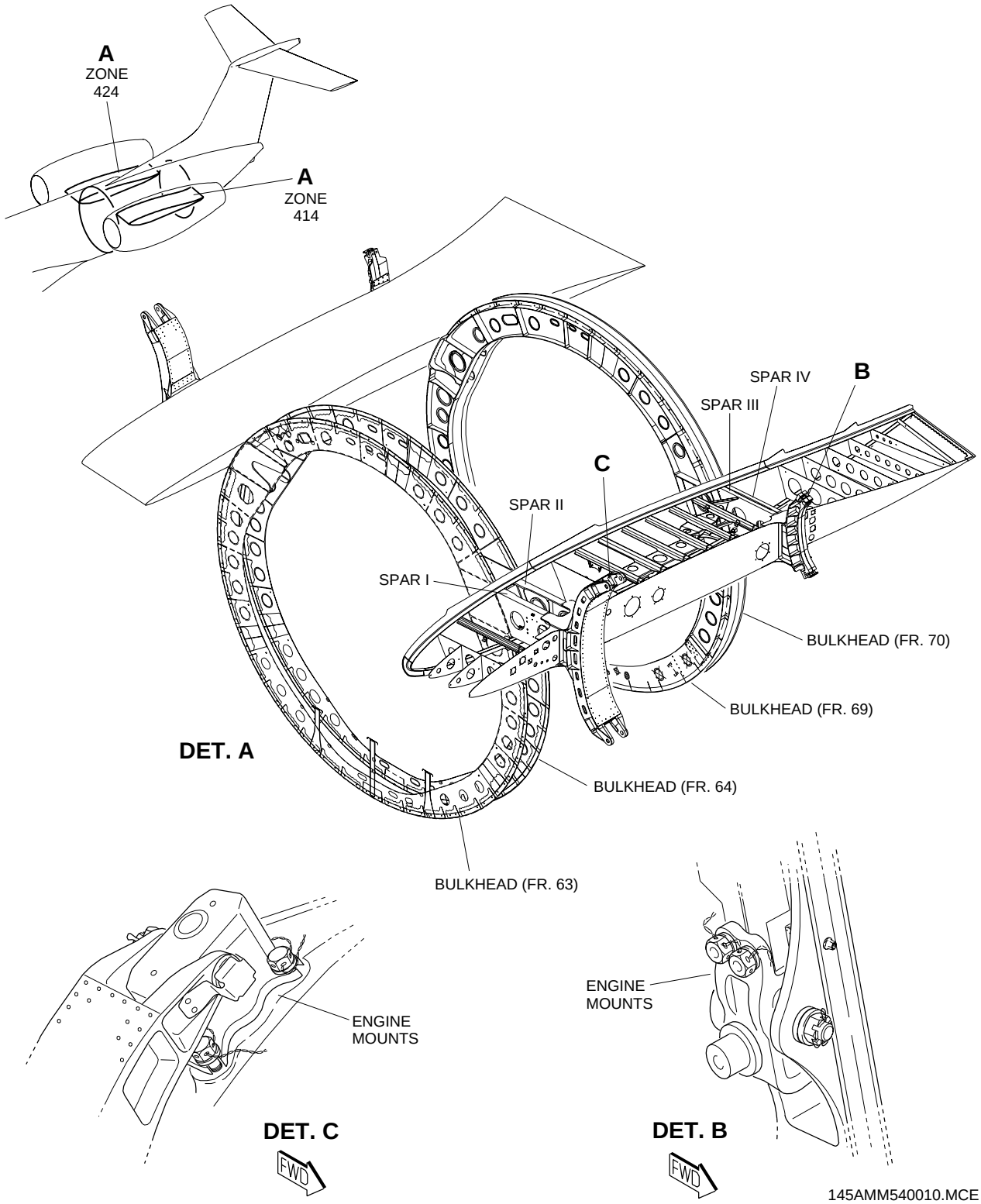
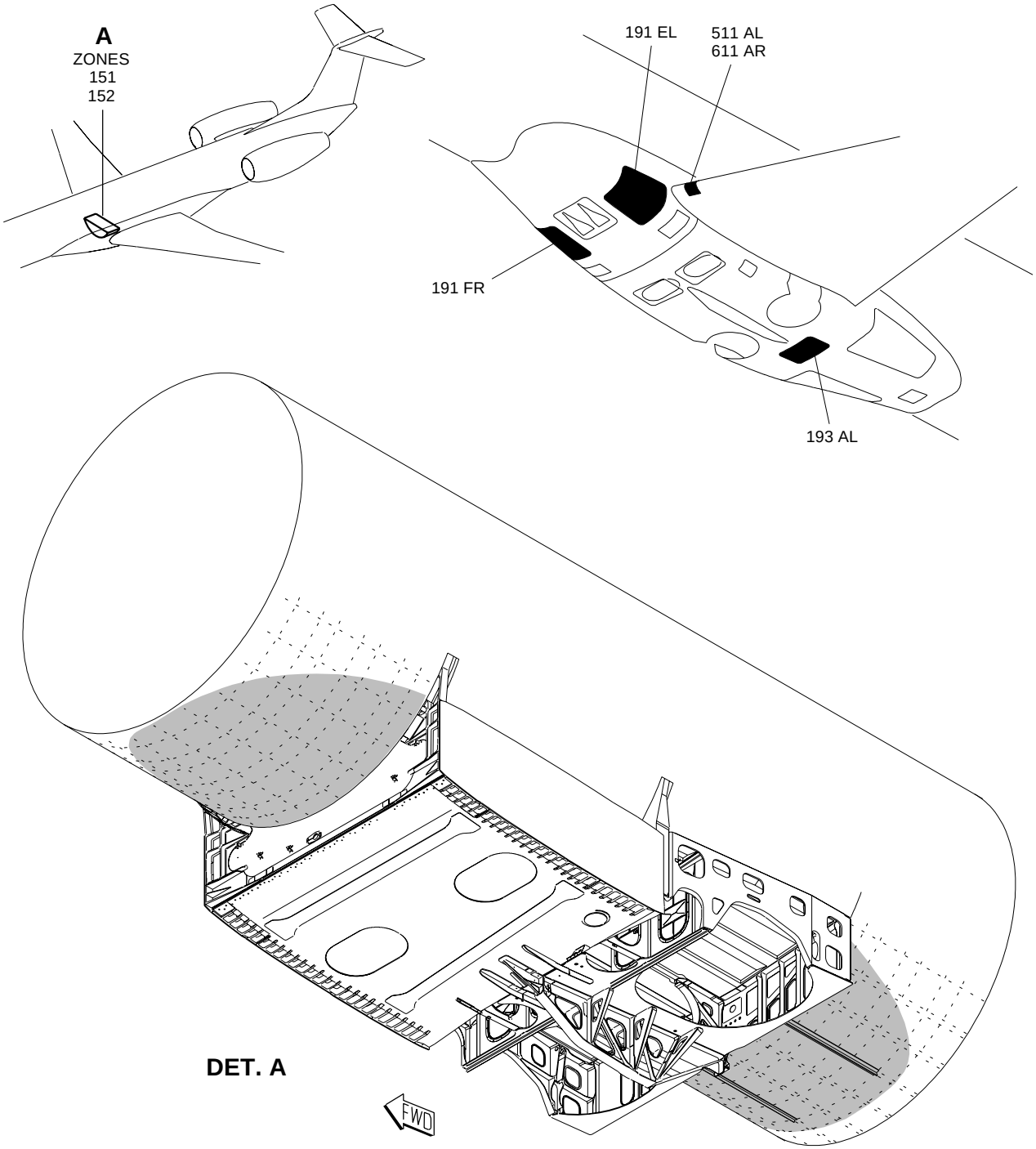
EFFECTIVITY: ALL

Engine Mounts, Spars, and Bulkheads
Figure 604



EFFECTIVITY: ALL

Wing Stub Region - Phase-I Inspection
Figure 605



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