TOWING - MAINTENANCE PRACTICES

EFFECTIVITY: ALL

1. General

A. This section gives the task for aircraft towing. Aircraft towing operations are only possible with the aid of a power equipment, preferably equipped with fluid drive transmission.

B. The recommended towbar attachment head GSE 009 has a shear pin that breaks with a load of more than 4,418 kg (9,740 lb) (tension compression shear) or 4,300 N.m (38,053 lb.in) (Radial shear). This prevents damage to the landing gear or the aircraft structure if an excessive load occurs.

C. Figure 201 shows the ground towing factors that are most important in different conditions. You can find the necessary towbar and the total wheel-traction load with these data: aircraft weight, pavement slope, coefficient of friction, and engine idle thrust.

The example of the figure shows an aircraft gross weight of 17,000 kg (37,477 lb) and two engines with flight idle thrust. For a pavement of wet asphalt with a 2% slope, the tractor total wheel-traction load will be 1,750 kg (3,858 lb) and the towbar load will be 1,300 kg (2,866 lb) (Example A). If the towing is rearward without idle thrust or with ground idle thrust, these numbers change as follows: 1,125 kg (2,480 lb) of tractor total wheel-traction load and 850 kg (1,874 lb) of towbar load (Example B).

D. 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*
09-10-00-500-801-A	AIRCRAFT TOWING	ALL

TASK 09-10-00-500-801-A
EFFECTIVITY: ALL

2. AIRCRAFT TOWING

A. General

(1) The aircraft towing is the usual procedure when it is necessary to move the aircraft on the ground.

B. References

REFERENCE	*DESIGNATION*
AMM TASK 32-00-01-910-801-A/200	LG SAFETY PIN - INSTALLATION AND REMOVAL
AMM TASK 32-49-01-600-801-A/300	MLG WHEEL TIRE - CHECK AND CHARGE
AMM TASK 32-49-04-600-801-A/300	NLG WHEEL TIRE - CHECK AND CHARGING
ITEM GSE 008	TOWBAR - AIRCRAFT
ITEM GSE 009	HEAD - TOWBAR ATTACHMENT
S.B.145-32-0057	-

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

ITEM	*DESCRIPTION*	*PURPOSE*	*QTY*
GSE 008	Towbar, aircraft	Aircraft towing	
GSE 009	Head, towbar attachment	Aircraft towing	
GSE 012	Chock, wheel	To chock the nose and main LG wheels	
GSE 259	Cover, winglet (if applicable)	To signalize the winglets	

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	Towbar
1	Helps with the task	In the cockpit

I. Preparation

SUBTASK 841-002-A

WARNING: WHEN YOU TOW THE AIRCRAFT, ALL PEOPLE MUST STAY OUT OF THE DANGEROUS AREAS AROUND THE TOW TRACTOR, NOSE WHEEL, MAIN WHEELS AND AIRCRAFT FUSELAGE AND WINGS. PEOPLE ON GROUND CAN BE RUN OVER BY NOSE WHEEL, MAIN WHEELS, TOW TRACTOR AND AIRCRAFT FUSELAGE AND WINGS. THIS IS BECAUSE THE AIRCRAFT WILL CHANGE POSITION DURING PUSHBACK AND TOWING. OBEY SAFE DISTANCE BETWEEN PEOPLE ON GROUND AND THE EQUIPMENT THAT MOVES. A FATAL INJURY CAN OCCUR.

CAUTION:
- TOW THE AIRCRAFT ONLY WITH A TOWBAR SPECIFIED IN ITEM ITEM GSE 008 AND ITEM ITEM GSE 009. ALTERNATIVE DEVICES CAN CAUSE DAMAGE TO THE AIRCRAFT.
- DURING TOWING OPERATIONS, A TECHNICIAN MUST STAY IN THE COCKPIT TO SET THE EMERGENCY/PARKING BRAKE, PULLING THE EMERGENCY/ PARKING BRAKE HANDLE (DET. A, FIGURE 202) AS NECESSARY. EXCEPT FOR THE CASE THE AIRCRAFT IS MOVED WITH NO BRAKE SYSTEM AVAILABLE, ON THE REPAIR FACILITIES, TOWING MUST BE DONE WITH PERSONNEL READY, STANDING BY WITH CHOCKS FOR EMERGENCY USE.
- DURING THE TOWING OPERATIONS WITH THE ELECTRICAL SYSTEM ENERGIZED, MAKE SURE THAT THE ELECTRIC MOTOR-DRIVEN HYDRAULIC PUMPS ARE OFF.
- REMOVE ALL TOOLS, EQUIPMENT, AND MATERIALS FROM THE TOWING AREA. MAKE SURE THAT THE AREA IS CLEAN.
- TO PREVENT PEAK LOADS, MAKE SURE THAT ACCELERATION AND DECELERATIONS DURING TOWING ARE SMOOTH. POWER EQUIPMENT THAT IS EQUIPPED WITH FLUID DRIVE TRANSMISSION HELPS TO PREVENT PEAK LOADS.
- DO NOT MOVE OR TOW THE AIRCRAFT OUT OF THE HANGAR WITH FUEL TANK ACCESS PANELS OPEN. IF YOU DO THIS, CONTAMINATION CAN OCCUR IN THE FUEL TANK AND SOME DAMAGE CAN OCCUR TO THE FUEL SYSTEM AND ITS COMPONENTS.

(1) Make sure that the safety pins of the landing gear are correctly installed (AMM TASK 32-00-01-910-801-A/200).

NOTE: The use of the safety pins on MLG and NLG is optional when you tow or push the aircraft for the flight. This occurs when the aircraft is in position for the flight crew to taxi the aircraft before or after a flight.

(2) For aircraft with winglets, make sure that the winglet covers (GSE 259) are applied.

(3) Check the correct ground towing requirements on the Ground Towing Requirements chart (Figure 201) so as to size your tow tractor appropriately according to the aircraft.

(4) Make sure that the emergency/parking brake accumulator is pressurized . Pull the emergency/parking brake handle (DET. A, Figure 202) and with the aircraft energized make sure that the "brake on" lights (DET. B and DET. D, Figure 202) are on.

NOTE: To prevent hydraulic fluid transference from system 1 to system 2 or vice-versa, first apply brakes with the pedals and then pull or release the emergency/parking brake handle.

(a) For the case the aircraft is moved with no brake system available on the repair facilities, towing must be done with personnel ready, standing by with chocks for emergency use.

(5) On the circuit breaker panel, open the STEER circuit and attach a DO-NOT-CLOSE tag to it. On aircraft POST-MOD. S.B.145-32-0057, alternatively set the external steering disengagement switch to the "DISENGAGED" position (DET. E and DET. F, Figure 202). Make sure that the "STEER INOP" message comes into view on the EICAS display.

(6) On the circuit breaker panel, open the INTEG STBY circuit breaker (Location tip: ESSENTIAL DC BUS 2/INTEG STBY) and attach a DO-NOT-CLOSE tag to it.

J. Towing (Figure 201) (Figure 202)

SUBTASK 580-002-A

(1) Remove the lock pin from the guide pin on towbar assembly GSE 008 and GSE 009 (Figure 202).

(2) Make sure that the shear pin of GSE 009 (VIEW C) is in good condition. If there is a sheared shear pin, do a visual inspection and change the shear pin according to the vendors documentation.

(3) Install towbar assembly GSE 008 and GSE 009 on the nose landing gear.

(4) Put the guide pin in the towing attachment of the nose landing gear.

(5) Lock the guide pin with the lock pin.

(6) Install the other end of towbar assembly GSE 008 and GSE 009 to the tow tractor.

(7) Make sure that tires are in a serviceable condition. If necessary, do the check and charging of tires, refer to AMM TASK 32-49-01-600-801-A/300 for the main wheel tires and AMM TASK 32-49-04-600-801-A/300 for the nose wheel tires.

(8) Remove the wheel chocks (GSE 012).

CAUTION: MAKE SURE THAT THE EMERGENCY/PARKING BRAKE IS RELEASED AND, WITH THE AIRCRAFT ENERGIZED, MAKE SURE THAT THE "BRAKE ON" LIGHTS (DET. B AND DET. D, FIGURE 202) ARE OFF.

(9) Release the emergency/parking brake. Set the emergency/parking brake handle to the down position (DET. A).

NOTE: To prevent hydraulic fluid transference from system 1 to system 2 or vice-versa, first apply brakes with the pedals and then pull or release the emergency/parking brake handle.

(a) For the case the aircraft is moved with no brake system available on the repair facilities, towing must be done with personnel ready, standing by with chocks for emergency use.

CAUTION:
- DURING TOWING OPERATIONS, A TECHNICIAN MUST STAY IN THE COCKPIT TO SET THE EMERGENCY/PARKING BRAKE, PULLING THE EMERGENCY/ PARKING BRAKE HANDLE (DET. A, FIGURE 202) AS NECESSARY. EXCEPT FOR THE CASE THE AIRCRAFT IS MOVED WITH NO BRAKE SYSTEM AVAILABLE, ON THE REPAIR FACILITIES, TOWING MUST BE DONE WITH PERSONNEL READY, STANDING BY WITH CHOCKS FOR EMERGENCY USE.
- TOWING ACTIONS WITH SUDDEN STARTS AND STOPS CAN SHEAR THE SHEAR PIN (VIEW C) OF THE GSE 009.
- IF DURING THE TOWING THE SHEAR PIN IS SHEARED IT IS VERY DIFFICULT TO DRIVE THE AIRCRAFT. IN THIS SITUATION, CHECK IF THERE IS A SHEARED SHEAR PIN IN THE GSE 009 (VIEW C).
- IF DURING THE TOWING YOU FOUND A SHEARED SHEAR PIN IN THE GSE 009 (VIEW C), DO A VISUAL INSPECTION ON THE NOSE LANDING GEAR. IN CASE OF ANY DAMAGED PART REPAIR OR REPLACE THE PART AS APPLICABLE.
- DO NOT OVERSTEER. THE MAXIMUM TOWING ANGLE IS 170° TO THE RIGHT AND 170° TO THE LEFT. IF THE MAXIMUM TOWING ANGLE IS EXCEEDED DO A VISUAL INSPECTION ON NOSE LANDING GEAR. IN CASE OF ANY DAMAGED PART REPAIR OR REPLACE THE PART AS APPLICABLE.
- EFFICIENT COMMUNICATION BETWEEN TOW TRACTOR OPERATOR AND THE COCKPIT PERSON MUST BE ESTABLISHED BEFORE AIRCRAFT IS TOWED.
- USE THE AIRCRAFT BRAKES TO STOP THE AIRCRAFT ONLY WHEN THERE IS A RISK OF COLLISION OR DAMAGE TO THE AIRCRAFT AND IN ACCORDANCE TO THE TRACTOR OPERATOR.
- DO NOT TOW THE AIRCRAFT AT MORE THAN 24 KM/H (15 MPH).
- DO NOT PUSH-BACK THE AIRCRAFT AT MORE THAN THE 8 KM/H (5 MPH).
- DO NOT ACTUATE THE STEER HANDLE IN CASE OF UNCOMMANDED SWERVING OR INADVERTENT "STEER INOP" MSG.

CAUTION: OBEY THE MAXIMUM RECOMMENDED WIND SPEEDS FOR AIRCRAFT TOWING.

- DRY RUNWAYS - 92 KM/H (49 KTS).
- WET RUNWAYS - 83 KM/H (44 KTS).
- SNOW-COVERED RUNWAYS - 55 KM/H (29 KTS).
- ICE-COVERED RUNWAYS - 18 KM/H (10 KTS).

CAUTION: OBEY THE GROUND TOWING REQUIREMENTS AS SHOWN IN FIGURE 201:

- RUNWAY PERCENT SLOPE (5% MAXIMUM).
- NUMBER OF ENGINES BACKING AGAINST FLIGHT - IDLE THRUST.
- KIND OF RUNWAY.
- TOWING VEHICLE CAPACITY.

(10) Make sure that all the steps above are obeyed. After that, do the towing as follows:

(a) Tow the aircraft slowly straight ahead before you turn it.

(b) Complete the aircraft towing in a straight line for a minimum of 3 meters (10 feet) or until the nose wheel is near the center position (approximately 0°).

K. Follow-on

SUBTASK 842-002-A

(1) Set the emergency/parking brake and, with the aircraft energized, make sure that the "brake on" lights (DET. B and DET. D, Figure 202) are on.

NOTE: To prevent hydraulic fluid transference from system 1 to system 2 or vice-versa, first apply brakes with the pedals and then pull or release the emergency/parking brake handle.

(a) For the case the aircraft is moved with no brake system available on the repair facilities, towing must be done with personnel ready, standing by with chocks for emergency use.

(2) Install the wheel chocks (GSE 012).

(3) Remove towbar assembly GSE 008 and GSE 009 from the tow tractor (Figure 202).

(4) Remove the lock pin from the guide pin on towbar assembly GSE 008 and GSE 009.

(5) Remove the guide pin from the towing point of the nose landing gear.

WARNING: BEFORE YOU PRESSURIZE THE HYDRAULIC SYSTEM, MAKE SURE THAT THE TOWBAR ASSEMBLY IS REMOVED.

CAUTION: BEFORE YOU PRESSURIZE THE HYDRAULIC SYSTEM, MAKE SURE THAT THE NOSE WHEEL IS CLOSE TO CENTER POSITION (CLOSE TO 0°).

(6) Remove towbar assembly GSE 008 and GSE 009 from the nose landing gear.

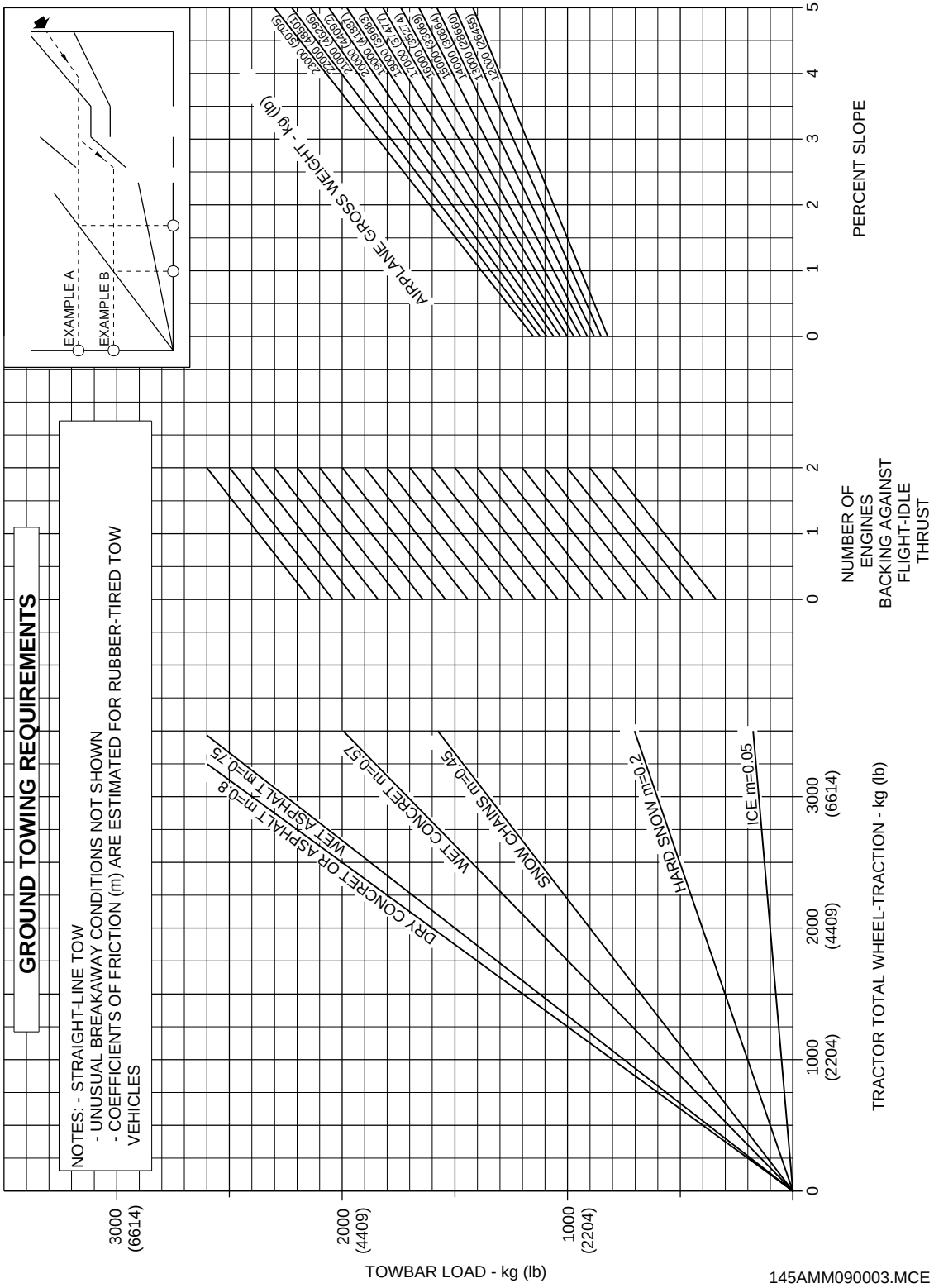
(7) On the circuit breaker panel, remove the DO-NOT-CLOSE tag and close the STEER circuit breaker. Or for aircraft POST-MOD. S.B.145-32-0057, set the external steering disengagement switch to the "ENGAGED" position (DET. E and DET. F, Figure 202).

(8) On the circuit breaker panel, close the INTEG STBY circuit breaker (Location tip: ESSENTIAL DC BUS 2/INTEG STBY) and remove the DO-NOT-CLOSE tag from it.

(9) For aircraft with winglets, remove the winglet covers (GSE 259).

EFFECTIVITY: ALL

Ground Towing Requirements
Figure 201



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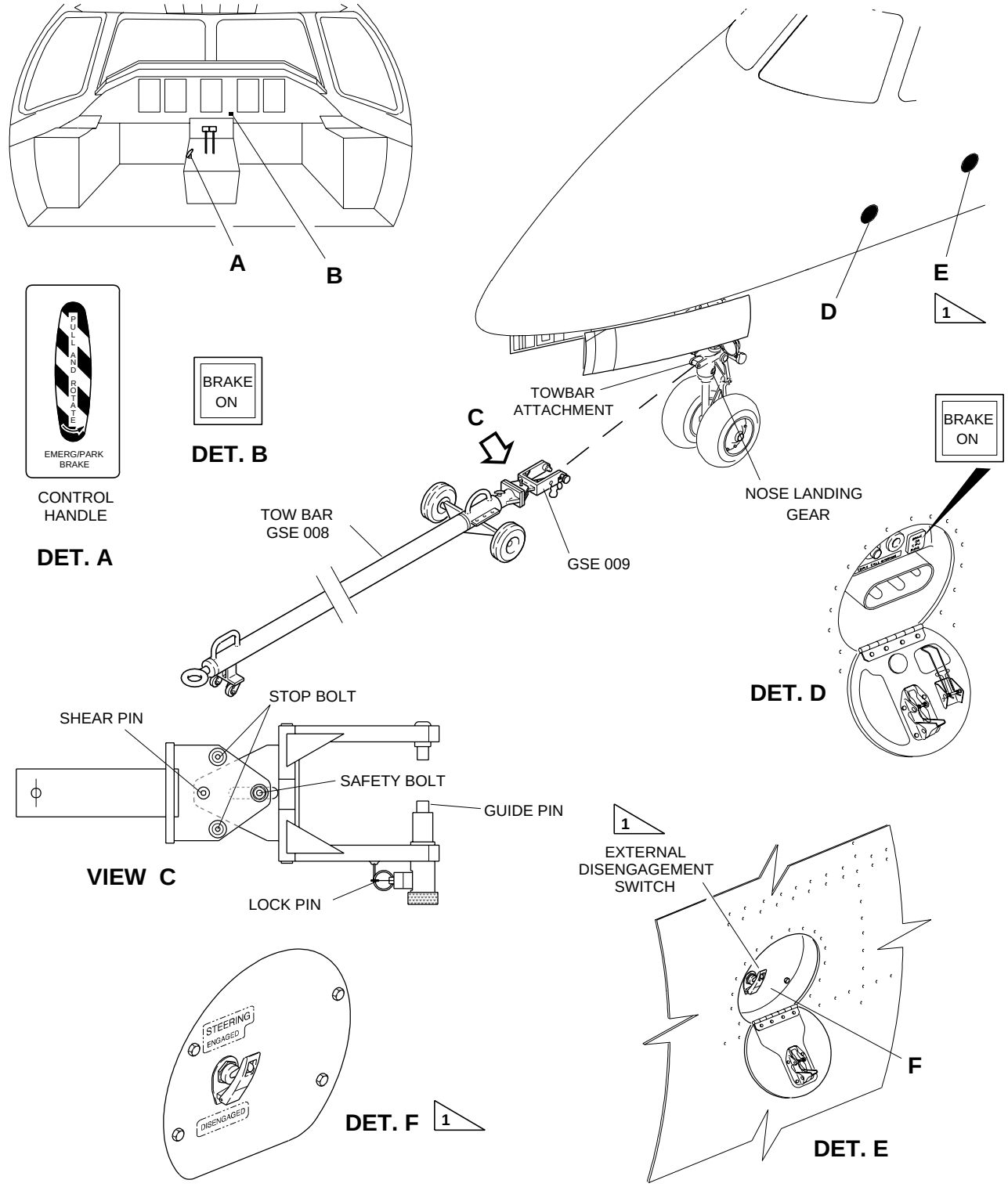
EFFECTIVITY: ALL
Towbar
Figure 202



1 POST-MOD SB 145-32-0057.

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