

TOWING – MAINTENANCE PRACTICES

1. General

A. Towbar Safety Precautions

Refer to Figure 201 and Figure 202.

All possible precautions must be taken to ensure the safety of personnel and the security of aircraft and equipment when moving an aircraft.

B. Towing of the Aircraft with Towbar

Refer to Figure 201 and Figure 202.

Equipment and Material

Lightweight tractor

Main wheel chocks – GSE Ref. No. 10-10-10 (refer to PSP 611)

Tow bar – GSE Ref. No. 09-10-01

or

Towbar, transportable – GSE Ref. No. 09-10-04

Door support cables (if required) – GSE Ref. No. 10-10-27

Headset with microphone and lead (two required) – GSE Ref. No. 23-00-01

Cord, headset extension – GSE Ref. No. 23-00-02

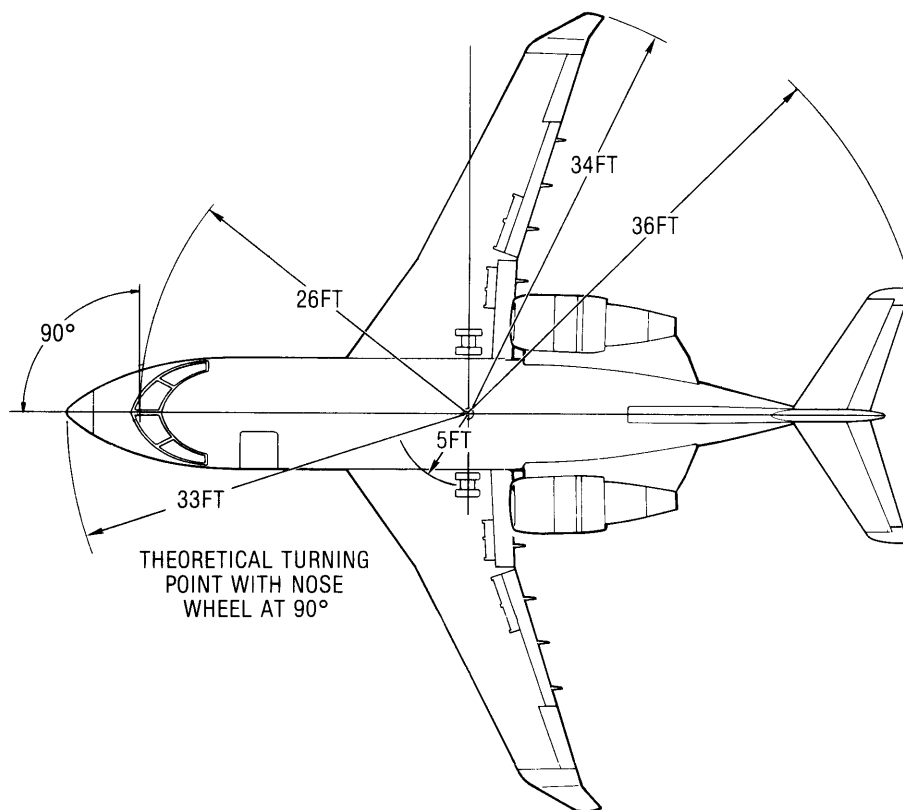
**CAUTION:** ENSURE THAT NOSE WHEEL STEERING ARMING SWITCH ON PILOT'S FACIA PANEL IS OFF AND REMAINS OFF DURING TOWING OPERATION. TORQUE LINKS MUST NOT BE DISCONNECTED.

BEFORE TOWING AIRCRAFT, ALLOW AIRCRAFT GYROS TO STABILIZE. ENSURE THAT EITHER AC POWER IS OFF AND HAS BEEN OFF FOR 5 MINUTES OR THAT AC POWER IS ON AND HAS BEEN ON FOR 5 MINUTES.

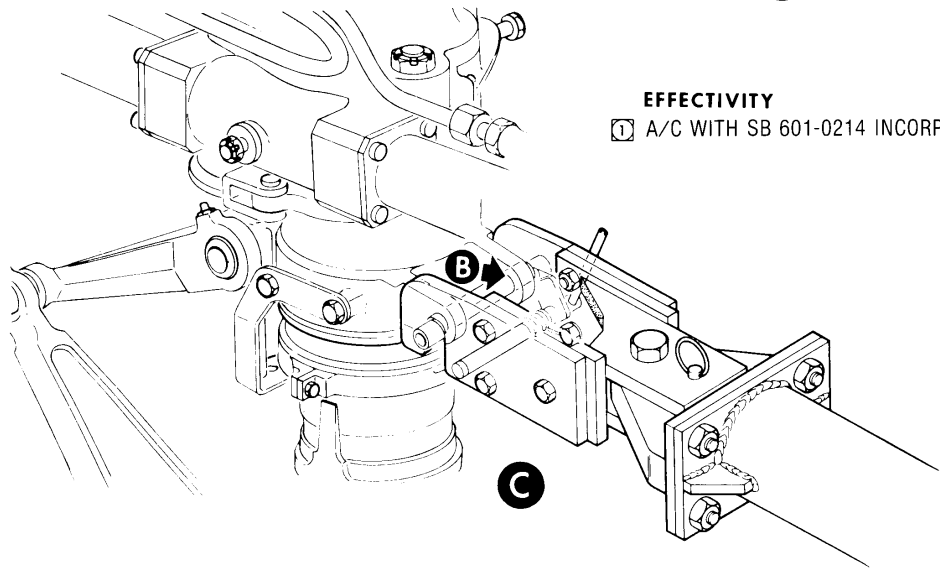
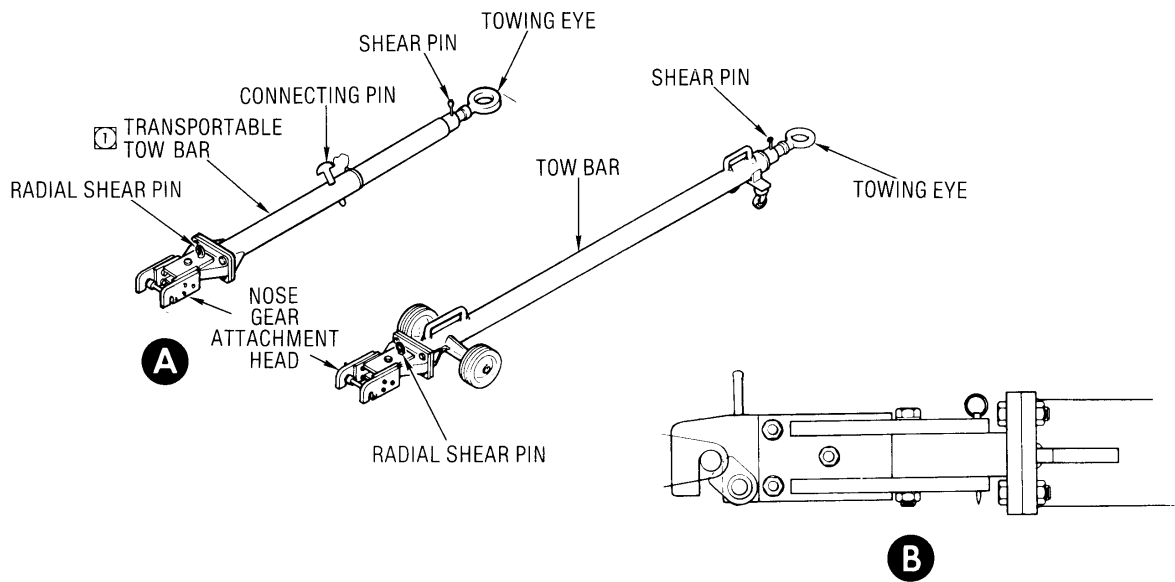
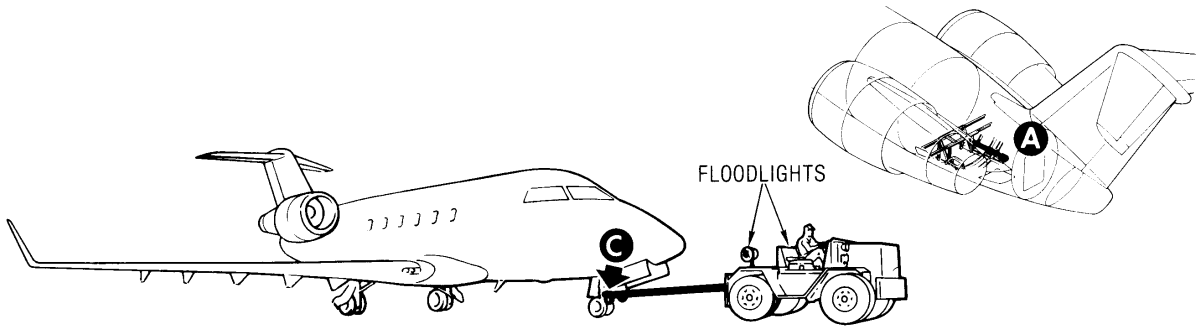
A MINIMUM LOAD IS REQUIRED ON NOSE WHEEL BEFORE TOWING AIRCRAFT (REFER TO PSP 601-9).

IF DOWNWARD OPENING PASSENGER/CREW ENTRANCE DOOR IS OPEN WHILE AIRCRAFT IS BEING TOWED, DOOR SUPPORT CABLES MUST BE IN PLACE TO PREVENT DAMAGE TO DOOR.

- (1) Obey and apply all the towbar safety precautions before towing the aircraft(refer to paragraph 1.A.).



Aircraft Towing Radii  
Figure 201



**EFFECTIVITY**  
① A/C WITH SB 601-0214 INCORPORATED.

Towing Aircraft  
Figure 202

- (2) Ensure that main and nose landing gear ground locking pins are installed (refer to Chapter 10).
- (3) Check brake pressure gauge in NLG wheel well to ensure sufficient brake pressure (1000 psi minimum). If pressure is not sufficient, operate No. 2 hydraulic system electric motor-driven pump and No. 3 hydraulic system electric motor-driven pump 3A (refer to Chapter 12).
- (4) Ensure that all tires and shock struts are correctly inflated (refer to Chapter 12).

**CAUTION:** TURNING THE NOSE WHEELS BEYOND 90 DEGREES FROM CENTRE WITH A TOW BAR COULD RESULT IN DAMAGE TO THE NOSE GEAR MECHANISM.

- (5) Attach tow bar to towing lugs on steering cuff of nose gear.
- (6) Ensure that all ground equipment and other obstacles are removed from vicinity of aircraft.

**CAUTION:** UNEVEN DISTRIBUTION OF WEIGHT ON THE TWO CABLES COULD RESULT IN DAMAGE TO THE ENTRANCE DOOR.

- (7) If towing with entrance door open, suspend door off ground using two support cables. Attach eye fitting to upper tension button in door frame and hook other end to lower handrail post fitting on door. Adjust cables for equal tension.
- (8) Ensure that an operator is in flight compartment for aircraft braking.
- (9) Switch BATTERY MASTER switch ON.
- (10) Check brake pressure gauge in flight compartment to ensure sufficient brake pressure (1000 psi minimum). If pressure is not sufficient, operate No. 2 hydraulic system electric motor-driven pump and No. 3 hydraulic system electric motor-driven pump 3A (refer to Chapter 12).

**NOTE:** An operator must be in the flight compartment throughout the tow process.

- (11) Connect tow bar to towing vehicle.

**CAUTION:** DURING TOWING, ONLY APPLY BRAKES IN AN EMERGENCY.

- (12) Connect intercom system between driver of towing vehicle and operator of aircraft brakes (refer to Chapter 23).
- (13) If in a congested area, position a person at each wing tip to ensure adequate distance from any obstruction in the vicinity of the aircraft.

- (14) If reversing the aircraft, position a person at the tail to ensure adequate distance from any obstruction.
- (15) Remove chocks and release parking brake.
- (16) Commence towing and limit speed to 5 mph.

**CAUTION:** IF AIRCRAFT IS PARKED WITH NOSE WHEELS NOT CENTERED THEY WILL RETURN TO CENTRE WHEN POWER IS APPLIED. THIS MAY CAUSE INADVERTENT MOVEMENT OF AIRCRAFT.

- (17) On completion of towing, ensure that nose wheels are in centered position. Apply parking brake, chock wheels, disconnect towing vehicle, remove tow bar from nose gear and park aircraft (refer to Chapter 10).

**NOTE:** In some cases after towing, a difference in main landing gear shock strut extension may exist. Check that the shock struts are correctly serviced (refer to Chapter 12).

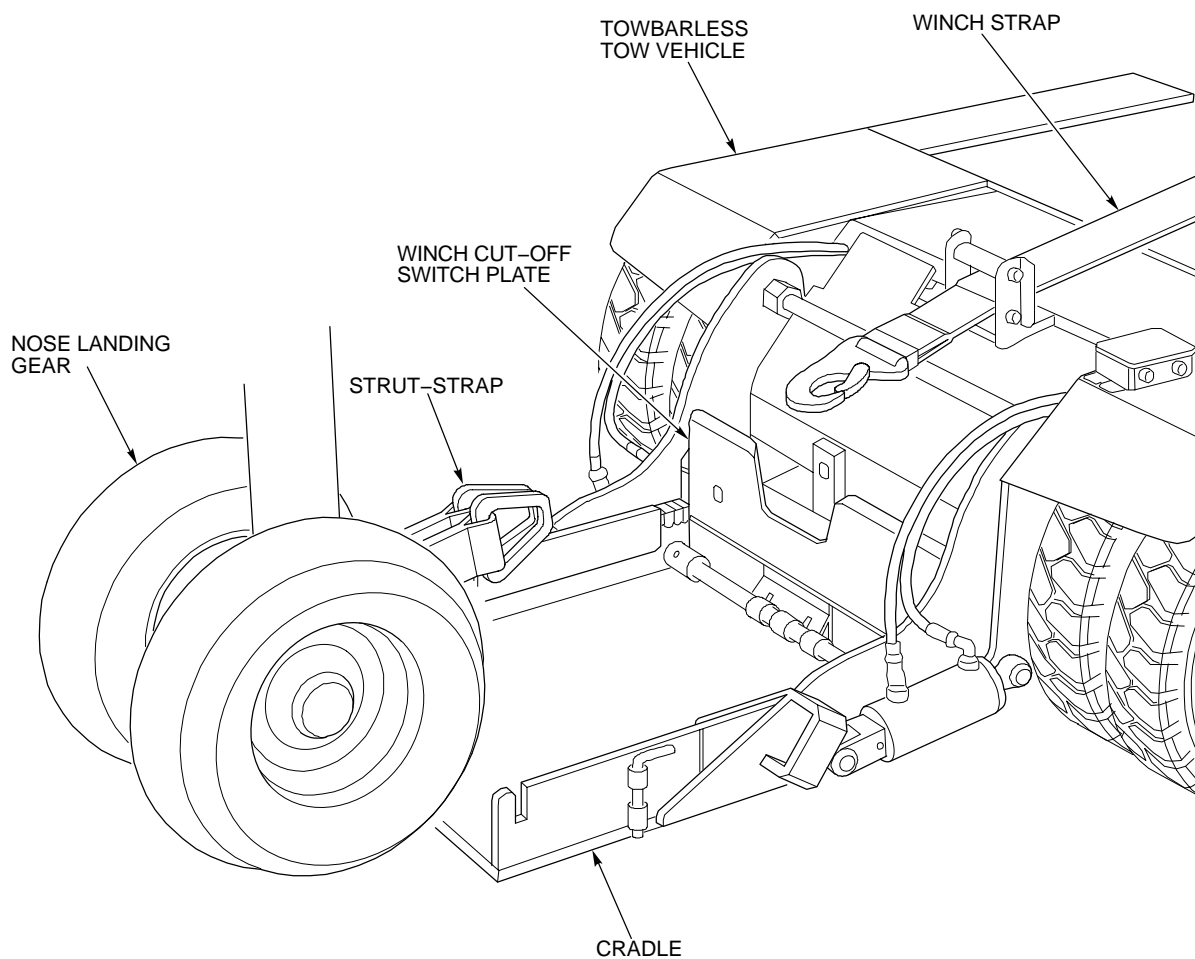
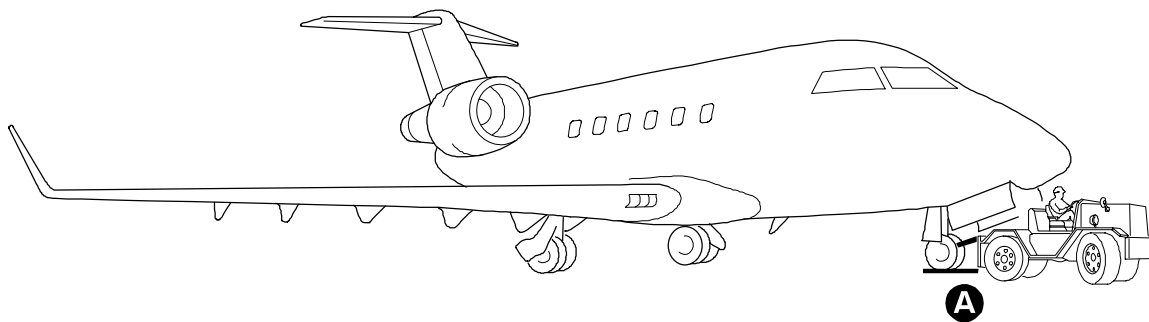
**CAUTION:** MAKE SURE TO READ ALL THE TOWBARLESS SAFETY PRECAUTIONS AND INSTRUCTIONS DEFINED AS FOLLOWS BEFORE TOWING THE AIRCRAFT WITHOUT TOWBAR.

IF THESE PRECAUTIONS AND INSTRUCTIONS ARE NOT FOLLOWED, INJURIES TO PERSONS, DAMAGE TO THE AIRCRAFT AND/OR TO THE EQUIPMENT CAN OCCUR.

### C. Towbarless Safety Precautions

Refer to Figure 201 and Figure 203.

- (1) Obey all local airport regulations.
- (2) Make sure to use the approved towbarless vehicle.
- (3) Obey all the instructions from Lektro Tug's Owner's manual.
- (4) Every two weeks, do a visual inspection of the winch cut-off plate to make sure the teflon surface is not damaged (refer to Lektro Tug's Owner's Manual).
- (5) Every two weeks, do an operational test of the winch cut-off switch plate (refer to Lektro Tug's Owner's Manual).
- (6) Before the aircraft is towed or pushed, do a visual inspection of the strut strap for possible damage. See if the protective sleeve is worn through. Look for abrasive material on the strut-strap that could damage the chrome surface on the oleo piston. Do not use a strut-strap that is damaged or not clean.



**TOWBARLESS TOWING OF THE AIRCRAFT**

**A**

Towing Aircraft  
Figure 203

- (7) Make sure to replace the winch-strap and the strut-strap at the interval specified in the LEKTRO owner's manual, part 2.
- (8) Before connecting the aircraft, make sure the aircraft wheels are free from obstacles.
- (9) Before the aircraft is towed or pushed, in the flight compartment, make sure the nosewheel steering system is set to off.
- (10) Do not tow the aircraft with a towbarless vehicle if a NLG shock strut indicates a requirement for servicing. A requirement for servicing indicates a possible damage to the aircraft and/or the landing gear.
- (11) Make sure the torque link is connected when the aircraft is towed or pushed.
- (12) Make sure the strut-strap is installed around the chrome surface of the oleo piston. Never allow the strut-strap to be around the outer cylinder above the oleo piston.
- (13) Make sure you do not bent or break the NLG fully-extended centered-proximity sensor when strut-strap is installed.
- (14) Make sure the NLG steering angle is within  $0\pm 5$  degrees limit when the NLG is pulled onto the cradle of the tow vehicle.
- (15) Make sure to pull the NLG onto the cradle until the tires activate the winch cut-off and are held tightly against the stop.
- (16) Make sure the cradle height does not exceed 4 inches (10.2 cm) at all time.
- (17) Make sure the aircraft is towed on an even and hard surface.
- (18) Make sure the pavement must be free from obstacles. The towing on excessive uneven pavement is prohibited. All steps must be lower than 1 inch (2.5 cm) at all time.
- (19) Make sure the aircraft is towed or pushed from or to the parked position with the NLG in the centered position at all time.
- (20) Do not tow the aircraft in a forward direction at more than 5 MPH (8 km/h).
- (21) Do not tow the aircraft in a rearward direction at more than 3 MPH (5 km/h).
- (22) Make sure to control the movement of the aircraft with the tow vehicle at all time.

- (23) Make sure that all changes to the speed or the direction are done gradually.
- (24) Make sure to do large turn when possible.
- (25) Make sure the turning angle is less than 45 degrees when the aircraft weight is equal or greater than the maximum landing weight (MLW). If the turning angle is exceeded at the MLW, the forward fuselage must be inspected.
- (26) Make sure the NLG turning angle is less than  $\pm 90$  degrees at all other weight condition.
- (27) Do not use the aircraft brakes when the aircraft is towed or pushed unless an emergency conditions occurs. If the aircraft brakes are used, the aircraft tow or push must be immediately stopped. Do a visual inspection of the components that follow for damage:
- NLG tires (Inspect the chine carefully)
  - NLG wheels (Inspect the beads carefully)
  - NLG piston chrome
  - NLG axles
  - NLG lower torque link
  - Forward fuselage structure.
- (28) If the nose wheel assembly position is different from the cradle position, the aircraft towing or pushing must be stopped immediately.

**NOTE:** For example, the nosewheel assembly does not follow the tug/cradle movement and starts to rotate on the cradle with one tire rolling off the cradle back wall or the rear gate (if applicable). This situation can indicate that the nosewheel steering system is not set to off position.

- (29) If the nosewheel steering system was powered during the towing operation and if the cradle height is inferior or equal to 3 inches (7.6 cm), do the steps that follow:
- The NLG must be removed and sent to the landing gear manufacturer for inspection at any angle. The NLG aircraft attachment points must be inspected for any damage or deformation.
- (30) Make sure that no objects are in or near the aircraft towing area.



- (31) Make sure that only persons necessary for the towing procedure are in the aircraft towing area.
- (32) Make sure that you obey the minimum clearances when you move the aircraft around parked aircraft or objects.

**CAUTION: MAKE SURE TO OBEY ALL THE TOWBARLESS SAFETY PRECAUTIONS AND INSTRUCTIONS (REFER TO PARAGRAPH 1.C)**

**IF THESE PRECAUTIONS AND INSTRUCTIONS ARE NOT FOLLOWED, INJURIES TO PERSONS, DAMAGE TO THE AIRCRAFT AND/OR TO THE EQUIPMENT CAN OCCUR.**

#### D. Towbarless Towing of the Aircraft

##### Equipment and Material

Vehicle, Towbarless Towing, LEKTRO models: AP8700B & AP8750B. Cradle, Standard Side-Gated Cradle with Chine Protectors (P/N APM1002A-1). Cut-Off Plate, Teflon Coated Winch Cut-Off Switch Plate Assembly (P/N: APM109AB-T) and Winch Cut-Off Micro Switch Assembly (P/N AP109AB). Spring, Switch Plate (P/N APM109AB-3).

Vehicle, Towbarless Towing, LEKTRO model: AP8750B-AL. Cradle, Standard Side-Gateless Cradle. Cut-Off Plate, Teflon Coated Winch Cut-Off Switch Plate Assembly (P/N: APM109AB-T) and Winch Cut-Off Micro Switch Assembly (P/N AP109AB). Spring, Switch Plate (P/N APM109AB-3).

Vehicle, Towbarless Towing, LEKTRO models: AP8800SDA & AP8850SDA. Cradle, Standard Side-Gated with Chine Protectors (P/N APM1002A-1). Cut-Off Plate, Teflon Coated Winch Cut-Off Switch Plate Assembly (P/N: APM109BC-T) and Winch Cut-Off Micro Switch Assembly (P/N AP109BC). Spring, Switch Plate (P/N APM109AB-3).

Strut-Strap, Standard 2" x 29" (5 x 74 cm) (P/N APM403EB).

Strut-Strap, Alternative 1" x 29" (2.5 x 74 cm) (P/N APM403VC).

Main wheel chocks - GSE Ref. No. 10-10-10 (refer to PSP 611).

Safety Locking Pin, ADG - GSE Ref. No. 10-10-14 or equivalent (refer to PSP 611).

Safety Locking Pin, NLG - GSE Ref. No. 10-10-11 (refer to PSP 611).

Safety Locking Pin, MLG - GSE Ref. No. 10-10-17 (refer to PSP 611).

Headset with microphone and lead (two required) - GSE Ref. No. 23-00-01 (refer to PSP 611).

Cord, headset extension - GSE Ref. No. 23-00-02 (refer to PSP 611).

- (1) Apply and obey all the towbarless safety precautions before towing the aircraft (refer to paragraph 1.C.).
- (2) The minimum number of persons necessary to tow or push the aircraft are as follows:
  - (a) The towing director, who usually operates the tow vehicle, is in control of towing procedure at all times.
  - (b) When the aircraft is towed in open areas, a minimum of two persons are necessary for safety. One person is the towing director who operates the tow vehicle. The second person operates the aircraft brakes in the flight compartment.
  - (c) If the aircraft is towed in confined areas, a minimum of five persons are necessary for safety. One person is the towing director who operates the tow vehicle. The second person operates the aircraft brakes in the flight compartment. The third and fourth persons are at each wingtip to make sure that the wingtips have sufficient clearance. The fifth person makes sure that the tail of the aircraft has sufficient clearance.
  - (d) Make sure that the towing director and all persons (included in the towing procedure) have the voice communications equipment necessary to monitor each person.
  - (e) Make sure that the towing director and all persons (included in the towing procedure) can see each person to give/receive visual signals. If the aircraft is towed at night (or in bad weather conditions), make sure that all persons have the necessary visual aids.

**CAUTION: MAKE SURE TO OBEY ALL THE TOWBARLESS SAFETY PRECAUTIONS AND INSTRUCTIONS (REFER TO PARAGRAPH 1.C)**

**IF THESE PRECAUTIONS AND INSTRUCTIONS ARE NOT FOLLOWED, INJURIES TO PERSONS, DAMAGE TO THE AIRCRAFT AND/OR TO THE EQUIPMENT CAN OCCUR.**

- (3) Prepare the aircraft for towing as follows:
  - (a) Make sure the NLG ground locking pin is installed (refer to Chapter 10).
  - (b) Make sure the MLG ground locking pins are installed (refer to Chapter 10).
  - (c) Make sure that the air driven generator locking pin is installed (refer to Chapter 10).

- (d) Make sure that the MLG and NLG tires are correctly inflated (refer to Chapter 12).
- (e) On the NLG strut, find the nose wheel position placard. Apply temporary marks at both of the  $\pm 90$  degree positions so that the towing director can see the nose gear turn limits.
- (f) Do a detailed inspection of the MLG and NLG shock struts (extension) (refer to Chapter 12).
- (g) Make sure that the nosewheel steering system is set to off.
- (h) Make sure that the landing gear handle is set to DOWN position.
- (i) Make sure that all the servicing equipments are disconnected from the aircraft.
- (j) Make sure that the grounding wire is disconnected from the aircraft.
- (k) Make sure that all the external doors and access panels are closed and latched. If it is necessary to keep the passenger door open during the towing procedure, install the passenger door cable kit as follows:
  - i. Attach the eye fitting to the upper tension button in the passenger door frame.
  - ii. Attach the other end to the lower handrail post fitting on the passenger door.

**CAUTION: MAKE SURE THE WEIGHT APPLIED ON THE TWO CABLES IS EQUAL. IF YOU DO NOT DO THIS, YOU CAN DAMAGE THE PASSENGER DOOR.**

- iii. Adjust the cable to have equal tension.

**CAUTION: MAKE SURE TO OBEY ALL THE TOWBARLESS SAFETY PRECAUTIONS AND INSTRUCTIONS (REFER TO PARAGRAPH 1.C)**

**IF THESE PRECAUTIONS AND INSTRUCTIONS ARE NOT FOLLOWED, INJURIES TO PERSONS, DAMAGE TO THE AIRCRAFT AND/OR TO THE EQUIPMENT CAN OCCUR.**

- (4) Connect the towbarless vehicle as follows:
  - (a) If necessary, connect a headset to the interphone.
  - (b) Set the BATTERY MASTER switch to ON.

- (c) Position the towbarless tow vehicle so that the cradle is in line with and directly in front of the NLG tires.
- (d) Install the strut-strap around the chromed surface of the oleo piston.
- (e) Remove the wheel chocks and make sure that the all wheels are free from blockage.
- (f) Tell or give the a signal to the brake operator that the wheel chocks are removed.
- (g) Make sure that parking brake lever is released.
- (h) Tell or give the signal to the towing director that the brakes are released.
- (i) Tell or give a signal to the brake operator that the NLG is going to be winched onto the cradle.
- (j) Winch the NLG onto the cradle.

**NOTE:** The NLG will stop when the tires reach the winch cut-off switch plate.

- (k) Raise the front edge of the cradle approximately 3 inches (7.6 cm). The cradle height must not exceed 4 inches (10.2 cm).

**CAUTION:** MAKE SURE TO OBEY ALL THE TOWBARLESS SAFETY PRECAUTIONS AND INSTRUCTIONS (REFER TO PARAGRAPH 1.C)

IF THESE PRECAUTIONS AND INSTRUCTIONS ARE NOT FOLLOWED, INJURIES TO PERSONS, DAMAGE TO THE AIRCRAFT AND/OR TO THE EQUIPMENT CAN OCCUR.

- (5) Tow the aircraft as follows:
  - (a) Make sure the required personnel are in place.
  - (b) Start to tow or push the aircraft in straight line slowly.
  - (c) Tow or push the aircraft in the correct area.

- (d) When the towing procedure is completed, stop the aircraft in a straight line (with the nosewheel in the center position) with the tow vehicle.

**NOTE:** Do not park the aircraft if the nosewheel is not in the center position. If necessary, move the aircraft forward in a straight line for a short distance (to center the nosewheel) before it is parked. This is necessary to remove twist forces from the landing gear before you stop the aircraft.

**CAUTION:** MAKE SURE TO OBEY ALL THE TOWBARLESS SAFETY PRECAUTIONS AND INSTRUCTIONS (REFER TO PARAGRAPH 1.C)

IF THESE PRECAUTIONS AND INSTRUCTIONS ARE NOT FOLLOWED, INJURIES TO PERSONS, DAMAGE TO THE AIRCRAFT AND/OR TO THE EQUIPMENT CAN OCCUR.

- (6) Disconnect the towbarless vehicle as follows:
- (a) Lower the front edge of the cradle to the ground level.
  - (b) Put the wheel chocks at the main wheels.
  - (c) Apply the parking brake.
  - (d) Tell or give a signal to the towing director that the parking brake is set.
  - (e) Tell or give a signal to the towing director that the wheel chocks are in the position.
  - (f) Release the tension on the strut-strap.
  - (g) Slowly back the tow vehicle up so that the cradle moves out from under the NLG.
  - (h) Remove the strut-strap from the NLG.
  - (i) Release the parking brake.
  - (j) Set the BATTERY MASTER switch to OFF.
- (7) Do the close out steps that follow:
- (a) Park the aircraft (refer to chapter 10).
  - (b) If the passenger door cable kit is installed, and it is not necessary at this time, remove it as follows:
    - i. Remove the eye fitting from the upper tension button in the passenger door frame.

- ii. Remove the other hand from the lower handrail post fitting on the passenger door.
- (c) If the interphone is not necessary at this time, disconnect the headset from the interphone.
- (d) Because of the differencess that can occur in the shock strut extension (caused by the towing procedure), do a detail inspection of the main landing gear and nose landing gear shock strut (extension) (refer to chapter 32).
- (e) Remove all tools, equipment, and unwanted materials from the work area.