# **CHAPTER**

07

# LIFTING AND SHORING



# CHAPTER 07 LIFTING AND SHORING

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A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

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# CHAPTER 07 LIFTING AND SHORING

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## **JACKING AIRPLANE - MAINTENANCE PRACTICES**

#### 1. General

- A. This procedure has the three tasks:
  - (1) Lift the airplane on jacks
  - (2) Lower the airplane off of the jacks
  - (3) Increase the airplane height by shock strut servicing.
    - (a) To get ground clearance to remove the engines.
    - (b) To get sufficient clearance to install some airplane jacks.
      - 1) It is possible to use some airplane jacks that do not have sufficient clearance with the airplane jack pad positions.
- B. Three primary jack points are used to lift and lower the airplane.
  - (1) These jack points have jack pads which are part of the airplane body Figure 201.
- C. Five auxiliary jack points can be used to make the airplane stable (when it is necessary) after the airplane is lifted to the necessary height Figure 201.
  - Jack adapters must be installed at the auxiliary jack points before these jack points can be used.
- D. The airplane can be lifted on jacks in winds up to 35 knots.
  - (1) You can do this if the jacks are designed and specified for the 777 airplane.
  - (2) If you use jacks that have the general specifications but are not designed for the 777, you must be careful.
    - (a) It is possible that you will have to decrease the maximum wind speed limit of 35 knots if you use different jacks.

#### TASK 07-11-01-580-804

## 2. Lift the Airplane with Jacks

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205)

#### A. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
12-15-01-610-810	Main Landing Gear Shock Strut Servicing (P/B 301)
12-15-02-610-805-002	Nose Landing Gear Shock Strut Servicing (P/B 301)
20-41-00-760-801	Electrical Bonding (P/B 201)
20-41-00-910-801	Static Grounding (P/B 201)
29-11-00-860-805	Center Hydraulic System Pressurization with an Air-Driven Pump (ADP) (P/B 201)
32-00-30-480-801	Landing Gear Downlock Pins Installation (P/B 201)
32-09-00-040-801	Air Mode Simulation - Preparation (P/B 201)
32-09-03-820-801	WOW Load Sensor Calibration (P/B 201)

# B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
SPL-1489	Fitting - Jack, Outer Wing
	Part #: J07003-1 Supplier: 81205
SPL-1490	Fitting - Jack, Inner Wing
	Part #: J07002-1 Supplier: 81205
SPL-1491	Fitting - Jack, Forward Body
	Part #: J07001-25 Supplier: 81205
SPL-1853	Retainer Equipment, MLG/NLG Torsion Link
	Part #: J32054-91 Supplier: 81205
	Part #: J32054-92 Supplier: 81205
STD-1071	Chocks - Wheel

#### C. Location Zones

Zone	Area
100	Lower Half of Fuselage
700	Landing Gear and Landing Gear Doors

#### D. Access Panels

Number	Name/Location
191SL	Jack Pad Cover Panel
192SR	Jack Pad Cover Panel

#### E. Prepare to Lift the Airplane on Jacks

SUBTASK 07-11-01-840-006



MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-30-480-801.

#### SUBTASK 07-11-01-040-002

(2) If electrical power is supplied to the airplane while it is on jacks, do the step that follows:



PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU INSTALL THE DEACTUATORS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERATE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Do this task: Air Mode Simulation Preparation, TASK 32-09-00-040-801.
  - 1) Make sure the APU does not initiate the autostart sequence when the airplane is lifted with the jacks.

NOTE: This is when electrical power is not supplied.

#### SUBTASK 07-11-01-580-015

EFFECTIVITY

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(3) Use the airplane gross weight to estimate the jack load (Figure 203).

NOTE: You can use Figure 203 to estimate the jack load but you must know the airplane gross weight.



#### SUBTASK 07-11-01-580-009



DO NOT CHANGE THE CENTER OF GRAVITY WHEN THE AIRPLANE IS ON THE JACKS. DO NOT PUT FUEL INTO THE FUEL TANKS, OR MOVE FUEL BETWEEN FUEL TANKS. DO NOT MOVE PERSONNEL AND EQUIPMENT IN OR NEAR THE AFT END OF THE FUSELAGE. IF YOU DO NOT OBEY THESE PRECAUTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

Make sure the airplane gross weight and center of gravity (CG) are at the approved limits (Figure 204).

NOTE: The maximum gross weight you can lift the airplane at the primary wing and fuselage jack points is shown in Figure 204. The procedure to calculate the gross weight and center of gravity (CG) is shown in the airplane's Weight and Balance Manual.

NOTE: It is the airplane operator's decision and responsibility to keep the center of gravity (CG) within the limits during maintenance and to make sure a minimum number of people are on the wings when the airplane is on jacks.

#### SUBTASK 07-11-01-580-010



DO NOT LIFT THE AIRPLANE ON JACKS IN WINDS MORE THAN 35 KNOTS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

Make sure the airplane is turned into the wind when it is out of the hangar.

NOTE: If you use jacks that have the general specifications but are not designed for the 777, be careful. It is possible that the maximum wind speed limit 40 mph (35 knots) will have to be decreased.

#### SUBTASK 07-11-01-860-002

- Apply a static ground to the airplane.
  - (a) Do this task: Static Grounding, TASK 20-41-00-910-801.
  - If you lift the airplane on jacks for a gear retraction test, ground airplane in two locations to the jack pads during landing gear retraction tests (TASK 20-41-00-760-801).

Turn the TCAS mode selector switch to STBY (standby) to prevent the possibility of transmitting data to nearby aircraft while on jacks.

#### SUBTASK 07-11-01-860-001

Deflate the main and nose shock struts.

NOTE: The landing gear struts are deflated prior to jacking to compensate for the geometry of the landing gear relative to the jacks.



MAKE SURE THAT THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE YOU INFLATE OR DEFLATE THE SHOCK STRUT. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

Remove the air valve cap.

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DO NOT LOOSEN THE AIR VALVE NUT MORE THAN TWO TURNS MAXIMUM WHEN THE LANDING GEAR STRUTS ARE PRESSURIZED. IF YOU LOOSEN THE AIR VALVE BODY MORE THAN TWO TURNS, THE PRESSURE CAN CAUSE THE VALVE TO BLOW OUT. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Loosen the air valve nut a maximum of 2 turns to allow the gas to release.
- (c) Let the shock strut deflate fully.
- (d) After the shock strut is fully deflated, open the air valve fully.

NOTE: The main gear shock strut is fully deflated when the dimension "A" is 3.125 in. (79.375 mm).

NOTE: The nose gear shock strut is fully deflated when the dimension "A" is 18.42 in. (467.87 mm).

#### SUBTASK 07-11-01-820-002

- Make the airplane level.
  - (a) Check the airplane for level.

NOTE: The airplane is level when the plumb bob indicates 0 degree pitch and 0 degree roll.

NOTE: Every partial degree away from 0 degree pitch and 0 degree roll of the airplane at the beginning of the jacking phase increases the chance of overloading the jacks, side loading the jacks, and exceeding jack extension capacity. If the airplane is not within the recommended pitch and roll limits, the airplane must be leveled prior to positioning the jacks. The landing gear struts are used to adjust the airplane attitude as necessary.

- 1) If the airplane is not level (0 degree pitch and 0 degree roll), do the steps below:
  - a) Inflate the nose or main gear shock struts as necessary to level the airplane.

NOTE: Inflate only the shock strut that is necessary to level the airplane.

Inflate with the smallest amount of nitrogen as necessary.

- <1> To inflate a nose gear shock strut, refer to the steps in TASK 12-15-02-610-805-002 under Service the Shock Strut.
- To inflate a main gear shock strut, refer to the steps in TASK 12-15-01-610-810 under Service the Shock Strut.

SUBTASK 07-11-01-480-006



DO NOT USE THE SHOCK STRUT RETENTION STRAP ON A SHOCK STRUT THAT IS PRESSURIZED. THE STRAP CAN BREAK AND CAUSE DAMAGE TO THE MAIN LANDING GEAR.



IF YOU WILL RETRACT THE NOSE LANDING GEAR, DO NOT INSTALL THE RETENTION STRAPS. DURING A RETRACTION, THE RETENTION STRAPS WILL CAUSE DAMAGE TO EQUIPMENT.

(10) If you do NOT retract the landing gear, install the retainer equipment, SPL-1853, on the shock struts.

NOTE: When the shock struts are deflated and the retention assembly is installed, the height you must lift the airplane will be decreased.

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#### SUBTASK 07-11-01-480-003

- (11) Install the wheel chocks, STD-1071, on all landing gear wheels to prevent the airplane forward and aft movement before the jacks are set (TASK 10-11-05-500-801).
  - (a) If the ramp slopes, make sure that the chocks down from the tires touch the NLG and MLG tires.
  - (b) If the ramp slopes, make sure that the chocks up from the tires do not touch the NLG and MLG tires.

#### SUBTASK 07-11-01-480-004

- (12) When you use the auxiliary jacks at jack points D, E, F G and H use the correct jack adapter as follows:
  - (a) For the forward body jack (jack point D), install the forward body jack fitting, SPL-1491, and the eight supplied bolts (J07001-15) as follows:



USE ONLY THE SPECIAL J07001-15 BOLTS SUPPLIED WITH THE JACK ADAPTER. USE OF ANY OTHER BOLT THAN THE J07001-15 BOLT CAN RESULT IN FAILURE OF THE JACK ADAPTER. THIS CAN CAUSE DAMAGE TO THE AIRPLANE.

- Remove the eight filler bolts from the jack pad at the forward body jack point D and install the jack adapter.
  - Keep the filler bolts so they can be installed after you remove the jack adapter.
     NOTE: The filler bolts can be stored in the holes on the jack adapter.
- (b) For the Mid Wing Auxiliary jacks (jack points E and F), install the auxiliary jack adapter inner wing jack fitting, SPL-1490, and the four supplied bolts (NAS6605-16) as follows:
  - Remove the four filler screws from jack points E and F (at the wing rear spar, rib 21, station 717) and install the jack adapter.
    - a) Keep the screws so they can be installed after you remove the jack fitting.
- (c) For the Outboard Wing Auxiliary jacks (jack points G and H), install the auxiliary jack adapter outer wing jack fitting, SPL-1489, and the four supplied bolts (NAS6605-16) as follows:
  - 1) Install the jack adapter at wing jack point G and H (at the wing front spar, rib 30, station 978.19) and install the jack.
    - a) Keep the screws so they can be installed after you remove the jack fitting.

#### SUBTASK 07-11-01-800-002

(13) Make sure the area is clear of persons, work platforms, entry stands, and other support equipment that are not necessary.

#### F. Lift the Airplane on the Jacks

#### SUBTASK 07-11-01-580-011

- (1) Do the steps that follow to lift the airplane on jacks:
  - (a) Put one person at each jack and one person at the plumb bob in the wheel well.
    - 1) Make sure there is communication between each person and the coordinator for the jack procedures.
  - (b) For the primary jack pad location, do this step:

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Remove these access panels:

<u>Number</u>	Name/Location
191SL	Jack Pad Cover Panel
192SR	Jack Pad Cover Panel

- (c) Put the primary jacks directly below the jack pads at jack points A, B, and C (Figure 202).
- (d) Rotate the jacks to align the castors to follow each other and center the jack.
- (e) Level the jacks with the jack pads or shims.
  - 1) Make sure that the jacks are level and that the jacks are seated on the ground.

NOTE: For the jack orientation, the jacks must be level. The orientation of the jacks relative to each other is critical. If the jacks are made level, theoretically, the jacks will be parallel to each other. Any deviation from level can induce side loads in the jacks as the geometry changes during the jacking phase.

(f) Operate the jack with hand pump or air pressure to push jack post up to the jack pad and seat jack in the jack pads.

NOTE: Refer to the jack manufacturers' instructions.

- 1) Seated the jacks with 500 lb (227 kg) to 1000 lb (454 kg) of pressure.
  - NOTE: The airplane is not lifted off the ground at this time.
- (g) Remove the wheel chocks, STD-1071.
- (h) Release the parking brake.



MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE MAIN LANDING GEAR TRUCKS. DO THIS WHEN YOU PRESSURIZE THE CENTER HYDRAULIC SYSTEM WITH THE AIRPLANE LIFTED ON THE PRIMARY JACKS. HYDRAULIC PRESSURE WILL TILT THE TRUCKS AND THE FAST MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(i) Lift the airplane with the jacks.

NOTE: The operator must keep the CG in limits during maintenance and make sure a minimum number of persons are on the wings when the airplane is on jacks.

- 1) Use the jack manufacturer's instructions and lift the airplane with the jacks until you get the specified loads (Figure 201).
- Continuously monitor the plumb bob to make sure the airplane is level when you jack.
  - a) Use the plumb bob to make sure that the airplane does not exceed  $\pm$  3 degrees of roll.
  - b) Use the plumb bob to make sure that the airplane does not exceed  $\pm$  0.5 degree of pitch.
- Continuously monitor the jacks and make sure the maximum jack point loads are not more than the design limits.
  - a) Do not read pressure for jack reading; use the Ton reading.
- 4) Keep a clearance of 1 in. (2.5 cm) or less from the nut to the collar until you complete the jacking.
- 5) Jack the airplane to the necessary height.

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EFFECTIVITY



a) If a landing gear shock strut is inflated to level the airplane, measure and record the pressure on the shock strut.

NOTE: This value will be necessary before the airplane is lowered to avoid sudden movement of the airplane.

b) If the landing gear will be retracted, do these steps:

NOTE: Prior to landing gear retraction, the tires must have a minimum clearance from the ground.

- <1> For airplanes with hydraulics applied, make sure the following conditions are true:
  - <a> Center hydraulic system is pressurized (TASK 29-11-00-860-805).</a>

NOTE: Center hydraulic pressure tilts the truck to 13 degrees forward wheels up.

- <c> The nose gear tires are minimum 6.0 in. (152.4 mm) above the ground.
- <d> The aft main landing gear tires and the are minimum 6.0 in. (152.4 mm) above the ground with the truck at full tilt.

NOTE: To provide adequate clearance for gear swing, the clearance must be between the lowest main landing gear tire and the ground with the center hydraulic system pressurized. The tires will touch the ground during the gear retraction and extension if the clearance is less than 6.0 in. (152.4 mm).

- <2> For airplanes with NO hydraulics applied, make sure the following conditions are true:
  - <a> The nose gear tires are minimum 6.0 in. (152.4 mm) above the ground.</a>
  - <br/>Main landing gear center axle is a minimum of 47 in. (1194 mm) above the ground.

NOTE: To provide adequate clearance for gear swing, the clearance must be between the main landing gear center axle and the ground. The tires will touch the ground during the gear retraction and extension if the clearance is less than 47 in. (1194 mm).

Make sure the nose landing gear shock strut is filled to the correct pressure before a gear retraction test (TASK 12-15-02-610-805-002).

NOTE: The landing gear struts are serviced using the fully extended / (unloaded) inflation pressures after the minimum jacking height is reached.

Make sure the main landing gear shock struts are filled to the correct pressure before a gear retraction test (TASK 12-15-01-610-810).

NOTE: The landing gear struts are serviced using the fully extended / (unloaded) inflation pressures after the minimum jacking height is reached.

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- c) If the landing gear will NOT be retracted, lift airplane until the clearance between the tires and the ground is enough to perform the intended maintenance.
- (j) If it is necessary, put the auxiliary jacks directly below the jack adapters at points D, E, F, G, and H.

NOTE: It is the airline's decision if the auxiliary jacks are necessary when the airplane is in the hangar (no wind).

NOTE: If you will use the auxiliary jacks, install the auxiliary jacks after you get the necessary airplane height with the primary jacks.

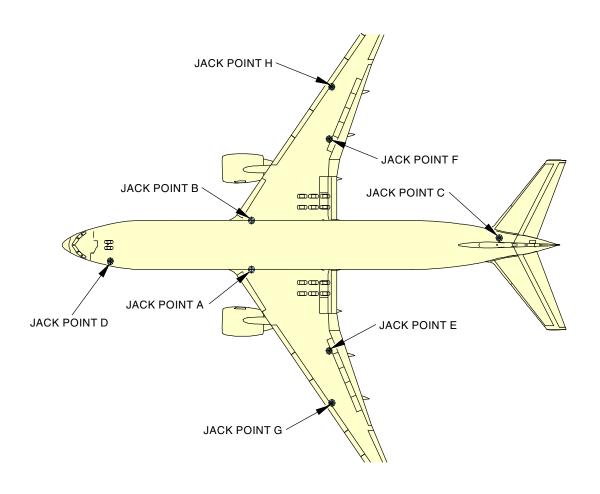
#### SUBTASK 07-11-01-700-002

(2) Do this task: WOW Load Sensor Calibration, TASK 32-09-03-820-801.

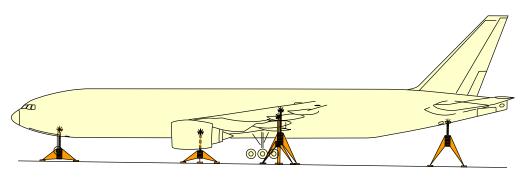
NOTE: Calibration after lowering the airplane is optional if the air calibration was done while on jacks.

------ END OF TASK ------





# **JACK POINT LOCATIONS**



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Airplane Jacking System Specifications Figure 201/07-11-01-990-801 (Sheet 1 of 2)

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				LOCATION		JACK POIN	T HEIGHT	
777-300ER JACK POINT		MAXIMUM JACK LOAD POUNDS (KG)	B STA	BBL	WL	MINIMUM FITTING INCHES (cm)	EXTENDED HEIGHT INCHES (cm)	ADAPTER FITTING NECESSARY
	А	238,000 (107,954)	1034.85	L 122.25	128.85	122.2 1 (310.4)	202.0 2 (513.1)	NO
PRIMARY	В	238,000 (107,954)	1034.85	R 122.25	128.85	122.2 <u>1</u> (310.4)	202.0 2 (513.1)	NO
	С	99,000 (44,906)	2268.46	R 34.45	182	194.2 1 3 (493.3)	255.0 <mark>2</mark> (647.7)	NO
	D	60,000 (27,216)	332.26	L 80.42	139.12	119.8 1 (304.3)	212.0 <b>2</b> (538.5)	YES
	Е	26,000 (11,793)	1421.81	L 527.34	207.25	204.4 1 (519.2)	282.0 <del>2</del> (716.3)	YES
AUXILIARY 4	F	26,000 (11,793)	1421.81	R 527.34	207.25	204.4 1 (519.2)	282.0 <mark>2</mark> (716.3)	YES
	G	17,100 (7,756)	1431.56	L 787.04	239.64	233.8 1 (593.9)	318.0 <u>2</u> (807.7)	YES
	Н	17,100 (7,756)	1431.56	R 787.04	239.64	233.8 1 (593.9)	318.0 <sup>2</sup> (807.7)	YES

- 1 JACK POINT HEIGHT BASED ON:
  - 1. AIRPLANE WEIGHT 518,000 LBS
  - 2. CG RANGE 14% TO 44% 3. STRUT OLEOS DEFLATED
  - 4. MAIN TIRES 52 x 21.0R22
  - NOSE TIRE 43 x 17.5R17
  - 5. NORMAL TIRE INFLATION
- 2 EXTENDED JACK HEIGHT BASED ON GROUND CLEARANCE IS NECESSARY FOR INNER CYLINDER REMOVAL
- HEIGHT ABOVE GROUND IS 184.7 INCHES (467.4 cm) WITH MAIN GEAR OLEO DEFLATED AND NOSE GEAR OLEO INFLATED
- LOADS, LOCATIONS AND HEIGHT ARE THE SAME FOR ALL 777 AIRPLANE MODELS.

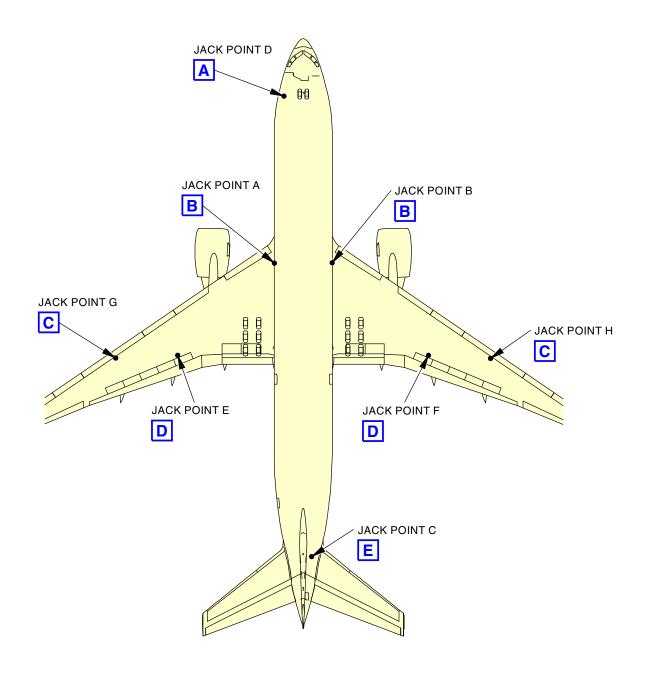
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Airplane Jacking System Specifications Figure 201/07-11-01-990-801 (Sheet 2 of 2)

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# Jack Pads and Adapters Figure 202/07-11-01-990-802 (Sheet 1 of 3)

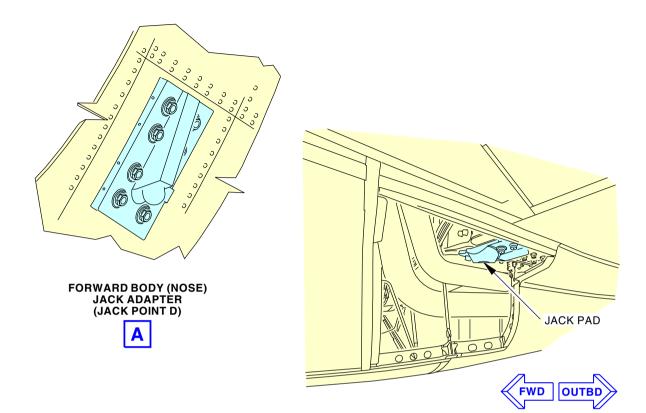
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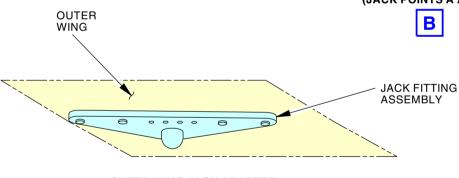
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BODY INTEGRAL JACK PAD (LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE) (JACK POINTS A AND B)



OUTER WING JACK ADAPTER (LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE) (JACK POINTS G AND H)



NOTE:

ACCESS PANEL REMOVED.

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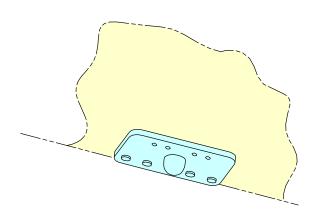
Jack Pads and Adapters Figure 202/07-11-01-990-802 (Sheet 2 of 3)

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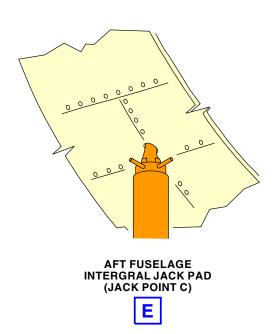
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INNER WING JACK ADAPTER (LEFT WING SHOWN, RIGHT WING OPPOSITE) (JACK POINTS E AND F)





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Jack Pads and Adapters Figure 202/07-11-01-990-802 (Sheet 3 of 3)

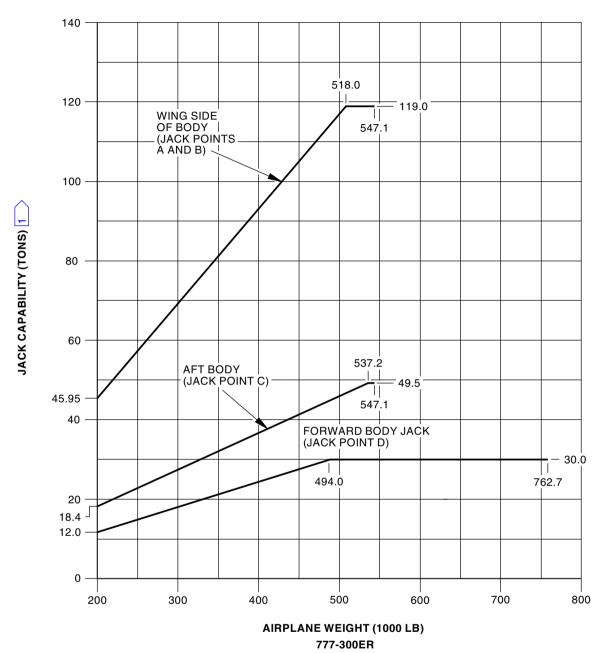
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1 LOADS BASED ON CRITICAL CG

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Jack Capability vs Airplane Weight Figure 203/07-11-01-990-803

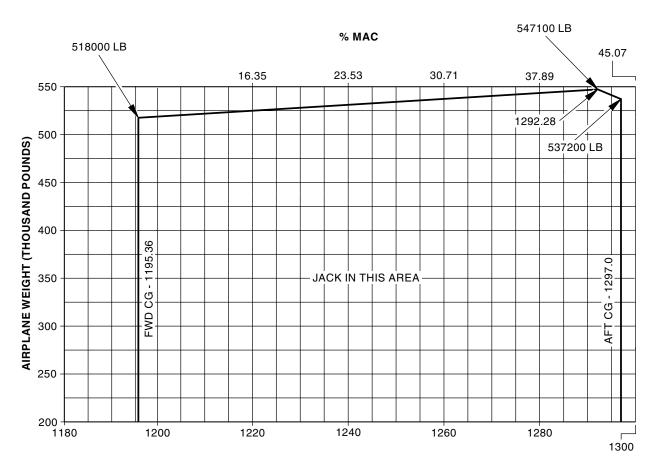
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# **AIRPLANE BODY STATION CG (INCHES)**

777-300 AND 777-300ER

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Airplane Jacking Weight and Center of Gravity Limits for Jacking at Primary Jack Points Figure 204/07-11-01-990-804

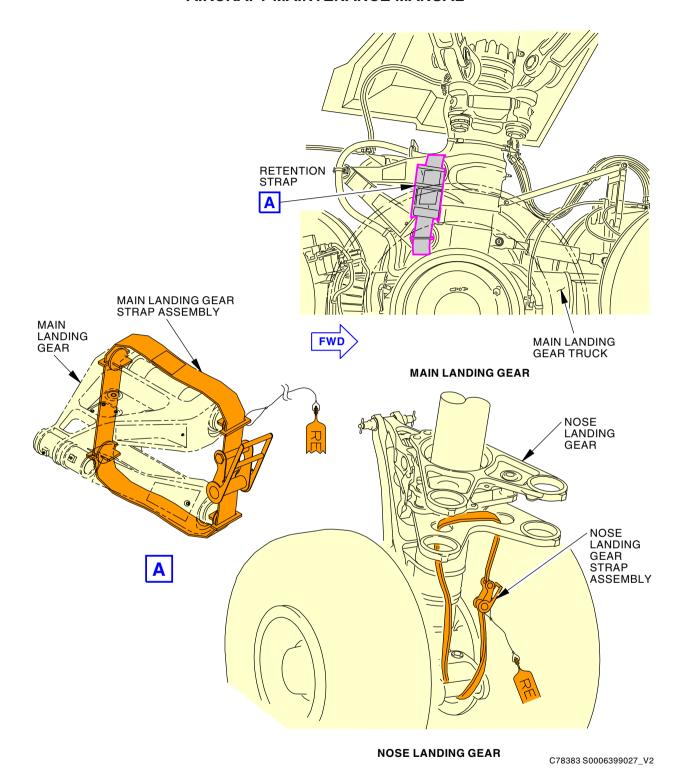
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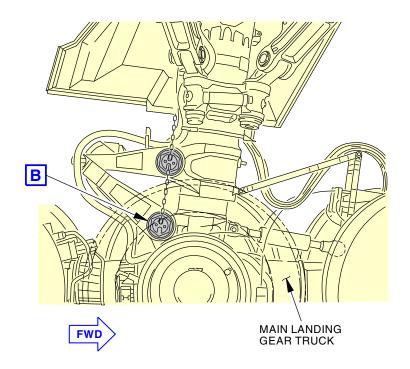
Landing Gear Shock Strut Retention Tool Installation Figure 205/07-11-01-990-805 (Sheet 1 of 2)

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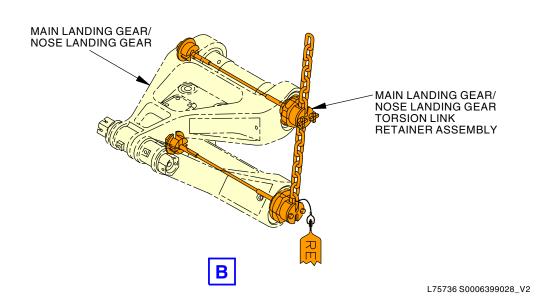
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#### **MAIN LANDING GEAR**



Landing Gear Shock Strut Retention Tool Installation Figure 205/07-11-01-990-805 (Sheet 2 of 2)

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#### TASK 07-11-01-580-805

#### 3. Lower the Airplane Off of the Jacks

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205)

#### A. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
12-15-01-610-810	Main Landing Gear Shock Strut Servicing (P/B 301)
12-15-01-901-801	Main Landing Gear Shock Strut Servicing - Nitrogen Only (P/B 301)
12-15-02-610-805-002	Nose Landing Gear Shock Strut Servicing (P/B 301)
12-15-02-610-806-002	Nose Landing Gear Shock Strut Servicing - Nitrogen Only (P/B 301)
32-00-30-480-801	Landing Gear Downlock Pins Installation (P/B 201)
32-09-00-440-801	Air Mode Simulation - Restoration (P/B 201)

## B. Tools/Equipment

Reference	Description
STD-1071	Chocks - Wheel

#### C. Consumable Materials

Reference	Description	Specification
G50237	Compound - Corrosion Inhibiting, Non-drying -	BMS3-38
	Cor-Ban 27I	

#### D. Location Zones

Zone	Area
100	Lower Half of Fuselage
700	Landing Gear and Landing Gear Doors

#### E. Access Panels

Number	Name/Location	
191SL	Jack Pad Cover Panel	
192SR	Jack Pad Cover Panel	

#### F. Prepare to Lower the Airplane off of the Jacks

SUBTASK 07-11-01-860-003

- (1) Do the applicable steps that follow to prepare the airplane to be lowered off of the jacks:
  - (a) If the landing gear shock struts have been serviced while the airplane was lifted for any maintenance operation, do these steps:

NOTE: This will avoid sudden movement of the airplane while you lower the airplane.

- 1) Deflate the main landing gear shock struts (TASK 12-15-01-610-810).
  - a) Make sure that the gas valve swivel nut is fully open.
- 2) Deflate the nose landing gear shock strut (TASK 12-15-02-610-805-002).
  - a) Make sure that the gas valve swivel nut is fully open.
- (b) If a shock strut was inflated to level the airplane before lifting, inflate the applicable shock strut to the strut pressure measured and recorded after the airplane was lifted.

NOTE: This will avoid sudden movement of the airplane while you lower the airplane.

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- 1) For the main landing gear shock strut, do this task: Main Landing Gear Shock Strut Servicing Nitrogen Only, TASK 12-15-01-901-801.
- 2) For the nose landing gear shock strut, do this task: Nose Landing Gear Shock Strut Servicing Nitrogen Only, TASK 12-15-02-610-806-002.

#### G. Procedure

#### SUBTASK 07-11-01-580-012

(1) Do the steps that follow to lower the airplane off of the jacks:



MAKE SURE THAT THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE THE AIRPLANE IS LOWERED. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

- (a) Make sure the area below the airplane is clear.
- (b) Make sure the landing gear control lever is in the DN position.



MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (c) Make sure the landing gear downlock pins are installed on the nose and main landing gear (TASK 32-00-30-480-801).
- (d) If the auxiliary jacks were used at jack points D, E, F, G, and H, lower the auxiliary jacks. NOTE: Refer to the jack manufacturer's instructions.
  - 1) Remove the auxiliary jacks from below the airplane.

<u>NOTE</u>: Do this immediately after the jacks clear the jack adapters and the adjacent airplane structure.

- (e) Install the wheel chocks, STD-1071, when the airplane is on the ground (TASK 10-11-05-500-801).
  - 1) Make sure the wheel chocks, STD-1071, do not touch the tires while you lower the airplane.
- (f) Put one person at each primary jack, one person at the plumb bob, and one person at the inclinometers.
  - 1) Make sure there is communication between each person and the coordinator for the jack procedures.
- (g) Lower the airplane.
  - 1) Continuously monitor the jacks and make sure the maximum loads are not more than the design load limits (Figure 201).
  - 2) Monitor the plumb bob and the inclinometers to make sure the airplane stays level while it is lowered off the jacks.
  - 3) Make sure the jacks are at the bottom or the airplane's full weight is on the landing gear.
- (h) Remove the primary jacks from jack points A, B, and C.

NOTE: Remove the jacks from below the airplane immediately after the jacks have cleared the jack pads and the adjacent airplane structure.

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#### H. Put the Airplane Back to Its Initial Condition

SUBTASK 07-11-01-840-009

- (1) Remove the jack adapters (when the auxiliary jacks were used) (Figure 202).
  - (a) Remove the jack adapter at jack point D, and install the eight filler bolts after Cor-Ban 27L Compound, G50237, is applied to the filler bolts on the fuselage.
  - (b) Remove the jack adapters at wing jack points E and F and install the four filler screws after Cor-Ban 27L Compound, G50237, is applied to the filler screws.
  - (c) Remove the jack adapters at wing jack point G and H.

#### SUBTASK 07-11-01-410-002

(2) Install the jack pad covers that you removed:

<u>Number</u>	Name/Location
191SL	Jack Pad Cover Panel
192SR	Jack Pad Cover Panel

#### SUBTASK 07-11-01-610-006

(3) Do this task: Main Landing Gear Shock Strut Servicing, TASK 12-15-01-610-810.

#### SUBTASK 07-11-01-610-007

(4) Do this task: Nose Landing Gear Shock Strut Servicing, TASK 12-15-02-610-805-002.

#### SUBTASK 07-11-01-840-010

(5) If electrical power was supplied during jacking do the steps that follow:



OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) If you did the deactivation procedure for the Air/Ground System, do this task: Air Mode Simulation - Restoration, TASK 32-09-00-440-801.

#### ——— END OF TASK ———

#### TASK 07-11-01-580-803

#### 4. Increase the Airplane Height by Shock Strut Servicing

#### A. References

Reference	Title
12-15-01-610-810	Main Landing Gear Shock Strut Servicing (P/B 301)
12-15-02-610-805-002	Nose Landing Gear Shock Strut Servicing (P/B 301)

#### B. Consumable Materials

Reference	Description	Specification
D00467	Fluid - Landing Gear Shock Strut	BMS3-32 Type II

#### C. Procedure

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SUBTASK 07-11-01-610-003

- (1) Increase the airplane height with extended shock struts as follows:
  - (a) Put the nose landing gear in its center position.

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MAKE SURE THAT THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE YOU INFLATE OR DEFLATE THE SHOCK STRUT. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

- (b) Remove the air to deflate the shock strut of the nose landing gear (TASK 12-15-02-610-805-002).
- (c) Remove the air to deflate the shock strut of the main landing gear (TASK 12-15-01-610-810).
- (d) Do the steps that follow to extend the shock struts of the landing gear with the correct servicing fluid:
  - 1) Close the air-charge valve of the shock strut.
  - Attach the oil charge line to the oil charge valve of the shock strut and open the valve.



DO NOT INFLATE THE SHOCK STRUTS TO MORE THAN 2000 PSI. IF THE SHOCK STRUTS ARE INFLATED TO MORE THAN 2000 PSI, INJURY TO PERSONS CAN OCCUR. DAMAGE TO EQUIPMENT CAN ALSO OCCUR.



DO NOT INFLATE THE NOSE-GEAR-SHOCK-STRUT TO AN "A" DIMENSION MORE THAN 40 INCHES. IF THE "A" DIMENSION IS MORE THAN 40 INCHES, DAMAGE TO THE SEALS CAN OCCUR.



DO NOT INFLATE THE MAIN-GEAR-SHOCK-STRUT TO AN "A" DIMENSION MORE THAN 26 INCHES. IF THE "A" DIMENSION IS MORE THAN 26 INCHES, DAMAGE TO THE SEALS CAN OCCUR.

- 3) Put the correct servicing fluid, D00467, into the shock struts with a pump (TASK 12-15-02-610-805-002).
  - Do this task: Main Landing Gear Shock Strut Servicing, TASK 12-15-01-610-810.
  - b) Do this until you get the necessary Dimension "A" of the shock struts.
- 4) Close the oil charge valve of the shock strut.

# D. Put the Airplane Back to Its Usual Condition

SUBTASK 07-11-01-610-004

(1) Do the steps that follow to lower the airplane to its correct height:



MAKE SURE THAT THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE THE AIRPLANE IS LOWERED. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

- (a) Make sure the area below the airplane is clear.
- (b) Make sure the landing gear control lever is in the DN position.

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- (c) Do this task: Nose Landing Gear Shock Strut Servicing, TASK 12-15-02-610-805-002.
  - NOTE: To correctly service the shock strut of the nose landing gear, remove the fluid used to extend the shock strut.
- (d) Do this task: Main Landing Gear Shock Strut Servicing, TASK 12-15-01-610-810.

NOTE: To correctly service the shock strut of the main landing gear, remove the fluid used to extend the shock strut.

----- END OF TASK -----

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#### **JACKING AIRPLANE NOSE - MAINTENANCE PRACTICES**

#### 1. General

A. There are three different procedures to lift the airplane nose with a jack.

NOTE: When the oil or gas level in the shock strut is changed you must reservice the strut before the airplane is returned to service

- (1) The first procedure is to lift the airplane nose with a nose jack after the shock strut is extended using strut oil.
- (2) The second procedure is to lift the airplane nose with a nose jack after the shock strut is extended using nitrogen.
- (3) The third procedure is to lift the airplane nose with a nose jack after the inner cylinder is retained by retention straps.
- B. Jack Point D is used to lift or lower the nose when the correct precautions are used.
  - (1) A jack adapter must be installed at Jack Point D before the airplane nose is lifted.



DO NOT LIFT THE AIRPLANE ON JACKS IN WINDS THAT ARE MORE THAN 35 KNOTS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO PEOPLE AND THE AIRPLANE CAN OCCUR.

- C. You can lift the airplane with jacks in winds up to 35 knots.
- D. To change a wheel or a tire, you can also lift the nose landing gear with a nose axle jack, (TASK 07-11-03-580-801).



MAKE SURE YOU EXTEND THE NOSE GEAR STRUT BEFORE THE AIRPLANE NOSE IS LIFTED AT JACK POINT D. THIS WILL LIMIT THE DISTANCE THE JACK RAM WILL HAVE TO BE EXTENDED. WHEN THE NOSE IS LIFTED INDEPENDENTLY AND SUFFICIENTLY FOR TIRE CLEARANCE, UNUSUAL LOADS ARE CAUSED. JACK POINT D WILL MOVE IN AN ARC ABOUT 3-1/2 INCHES AFT AND CAUSE LOADS THAT ARE MORE THAN DESIGN LOAD LIMITS. THE BEND FORCE OF THE JACK RAM CAN BE LESS THAN THE BREAKAWAY FORCE REQUIRED TO MOVE THE MAIN LANDING GEAR TIRES. DURING SOME CONDITIONS, JACK DAMAGE AND/OR DAMAGE TO THE AIRPLANE CAN OCCUR. THIS COULD MAKE THE RETRACTION OF THE JACK RAM NOT EASY OR NOT POSSIBLE.

E. You can lift the nose independently at Jack Point D after the nose shock strut has been extended.



DO NOT USE THE INNER CYLINDER RETENTION STRAP ON INFLATED SHOCK-STRUTS. THE RETENTION STRAP HAS A LOAD LIMIT.



IF YOU WILL RETRACT THE NOSE LANDING GEAR, DO NOT INSTALL THE RETENTION STRAPS. DURING A RETRACTION, THE RETENTION STRAPS WILL CAUSE DAMAGE TO EQUIPMENT.

F. The airplane nose can be lifted at Jack Point D when the nose strut is deflated, and the retention strap retainer equipment, SPL-1853 is installed, (TASK 07-11-01-580-804).

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#### TASK 07-11-02-580-801

#### 2. Lift the Airplane Nose on Jacks

(Figure 201, Figure 202)

#### A. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
12-15-02-610-805-002	Nose Landing Gear Shock Strut Servicing (P/B 301)
32-00-30-480-801	Landing Gear Downlock Pins Installation (P/B 201)

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1491	Fitting - Jack, Forward Body
	Part #: J07001-25 Supplier: 81205
SPL-1853	Retainer Equipment, MLG/NLG Torsion Link
	Part #: J32054-91 Supplier: 81205
	Part #: J32054-92 Supplier: 81205
STD-1071	Chocks - Wheel

## C. Consumable Materials

Reference	Description	Specification
C50056	Compound - Corrosion Inhibiting Material, Nondrying Resin Mix	BMS3-27
G50136	Compound - Corrosion Inhibiting, Non-drying Paste	BMS3-38

#### D. Location Zones

Zone	Area
100	Lower Half of Fuselage
711	Nose Landing Gear

## E. Prepare to Lift the Airplane on Jacks

SUBTASK 07-11-02-480-001

(1) Make sure the landing gear downlock pins are installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-30-480-801.

SUBTASK 07-11-02-860-002

(2) Make sure the airplane gross weight and center of gravity (CG) are at approved limits (Figure 202).

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#### SUBTASK 07-11-02-860-003



DO NOT LIFT THE AIRPLANE ON JACKS IN WINDS MORE THAN 35 KNOTS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

(3) Make sure the airplane is turned into the wind when it is out of the hangar.

NOTE: If you use jacks that have the general specifications but are not designed for the 777, be careful. It is possible that the maximum wind speed limit (35 knots) will have to be decreased.

(a) For the forward body jack (Jack point D), install the: forward body jack fitting, SPL-1491 and the (8) supplied bolts as follows:



USE ONLY THE SPECIAL BOLTS SUPPLIED WITH THE JACK ADAPTER. USE OF ANY OTHER BOLT THAN THE SPECIAL BOLTS MAY RESULT IN FAILURE OF THE JACK ADAPTER CAUSING DAMAGE TO THE AIRPLANE.

- 1) Remove the (8) filler bolts from the jack pad at the forward body jack point D and install the jack adapter.
  - Keep the (8) filler bolts so they can be installed after you remove the jack adapter.

NOTE: The filler bolts can be stored in the holes on the jack adapter.

#### SUBTASK 07-11-02-800-001

(4) Make sure the area is clear of persons, work platforms, entry stands, and other support equipment that are not necessary.

#### SUBTASK 07-11-02-480-003

- (5) Install the wheel chocks, STD-1071 for the main landing gear wheels, do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.
  - NOTE: The wheel chocks will prevent the forward and aft movement of the airplane before the jack is seated.
  - NOTE: If the ramp does not slope: Move the aft NLG chocks away from the tires. During the refuel, the NLG tires roll aft as the MLG shock absorber compresses. Make sure that the chocks do not touch the MLG tires. The weight of the fuel can lower the aircraft and cause the tires to catch the chocks.
  - NOTE: If the ramp slopes: Make sure that the chocks down from the tires touch the NLG and MLG tires. Make sure that the chocks up from the tires do not touch the NLG and MLG tires.

#### F. Lift the Airplane Nose with an Extended Shock Strut and a Nose Jack

#### SUBTASK 07-11-02-860-004

(1) Put the nose landing gear in its center position.

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SUBTASK 07-11-02-610-002



MAKE SURE YOU EXTEND THE NOSE STRUT BEFORE THE AIRPLANE NOSE IS LIFTED AT JACK POINT D. THIS WILL LIMIT THE DISTANCE THE JACK RAM WILL HAVE TO BE EXTENDED. WHEN THE NOSE IS LIFTED INDEPENDENTLY AND SUFFICIENTLY FOR TIRE CLEARANCE, UNUSUAL LOADS ARE CAUSED. JACK POINT D WILL MOVE IN AN ARC ABOUT 3-1/2 INCHES AFT AND CAUSE LOADS THAT ARE MORE THAN DESIGN LOAD LIMITS. THE BEND FORCE OF THE JACK RAM CAN BE LESS THAN THE BREAKAWAY FORCE REQUIRED TO MOVE THE MAIN LANDING GEAR TIRES. DURING SOME CONDITIONS, JACK DAMAGE AND/OR DAMAGE TO THE AIRPLANE CAN OCCUR. THIS COULD MAKE THE RETRACTION OF THE JACK RAM NOT EASY OR NOT POSSIBLE.



IF CHANGES TO LOADING ON NOSE LANDING GEAR SHOCK STRUT ARE ANTICIPATED FOR ANY REASON DURING EXTENSION AND JACKING OF NOSE, SHOCK STRUT OIL (METHOD 1) MUST BE USED. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE AIRCRAFT.

(2) Do the steps that follow to extend the shock strut of nose landing gear.

NOTE: There are two methods for extending the nose landing gear shock strut. Method 1 extends the shock strut using strut oil. Method 2 is an alternate method that extends the shock strut using nitrogen pressure.



OIL MUST BE USED WHEN THERE WILL BE A SUSTAINED LOAD APPLIED THROUGH THE NOSE GEAR. IF YOU DO NOT OBEY THESE INSTRUCTIONS, STRUCTURAL DAMAGE TO THE AIRPLANE WILL OCCUR.

(a) Method 1, Extend the shock strut with oil.



MAKE SURE THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE THE SHOCK STRUT IS DEFLATED. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

- (b) Fully deflate the nose landing gear shock strut. (TASK 12-15-02-610-805-002).
  - 1) Close the air-charge valve of the shock strut.
  - 2) Attach the oil charge line to the oil charge valve of the shock strut and open the valve.



DO NOT INFLATE THE SHOCK-STRUT TO MORE THAN 2000 PSI. IF THE SHOCK STRUT IS INFLATED TO MORE THAN 2000 PSI, INJURY TO PERSONS CAN OCCUR. DAMAGE TO THE NOSE LANDING GEAR CAN ALSO OCCUR.



DO NOT INFLATE THE NOSE GEAR SHOCK-STRUT TO AN "A" DIMENSION MORE THAN 40 INCHES. IF THE "A" DIMENSION IS MORE THAN 40 INCHES, DAMAGE TO THE SEALS CAN OCCUR.

 Put the correct quantity of servicing fluid into the shock strut until the "A" dimension of the shock strut is 40 inches (TASK 12-15-02-610-805-002).

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- 4) Close the oil or air charge valve of the shock strut.
- (c) Method 2, Extend the shock strut with nitrogen.



DO NOT APPLY A SUSTAINED LOAD TO THE AIRPLANE THROUGH THE NOSE GEAR WHILE IT IS INFLATED WITH NITROGEN. CONTINUOUSLY MONITOR THE SHOCK STRUT GAS PRESSURE WHILE LIFTING AND LOWERING THE AIRPLANE WITH THE JACK. IF THE PRESSURE BLEEDS OFF, OTHER JACK POINTS COULD BE OVERLOADED AND CAUSE STRUCTURAL DAMAGE TO THE AIRPLANE OR INJURY TO PERSONS.

1) Attach the air charge line to the air charge valve of the shock strut and open the valve.



DO NOT INFLATE THE SHOCK-STRUT TO MORE THAN 2000 PSI. IF THE SHOCK STRUT IS INFLATED TO MORE THAN 2000 PSI, INJURY TO PERSONS CAN OCCUR. DAMAGE TO THE NOSE LANDING GEAR CAN ALSO OCCUR.



DO NOT INFLATE THE NOSE GEAR SHOCK-STRUT TO AN "A" DIMENSION MORE THAN 40 INCHES. IF THE "A" DIMENSION IS MORE THAN 40 INCHES, DAMAGE TO THE SEALS CAN OCCUR.

- 2) Put the correct quantity of nitrogen into the shock strut until the "A" dimension of the shock strut is 40 inches (TASK 12-15-02-610-805-002).
- 3) Close the oil or air charge valve of the shock strut.

#### SUBTASK 07-11-02-580-001



MAKE SURE YOU KEEP THE AIRPLANE WEIGHT AND CENTER OF GRAVITY WITHIN THE CORRECT LIMITS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, STRUCTURAL DAMAGE TO THE AIRPLANE CAN OCCUR.

(3) Do the steps that follow to lift the airplane nose (Figure 202):

NOTE: Loosen the wheel chocks and release the parking brake during the jacking procedure. When the airplane is at the necessary height, install the main landing gear wheel chocks and apply the parking brake.

- (a) Put the jack directly below the jack pad at Jack Point D (Figure 201).
- (b) Make sure the jack is level and in the center of the jack adapter.
- (c) Operate the jack to put the jack in the airplane's jack adapter.
  - NOTE: Refer to the specific jack manufacturers' instructions.
- (d) Loosen the wheel chocks, release the parking brake, and jack the airplane nose until the nose gear tires are just raised and are no longer on the ground.





FAILURE TO INFLATE THE AIRPLANE NOSE GEAR STRUT TO A PRESSURE BETWEEN 150 PSI AND 250 PSI, WHICH ASSURES THE NOSE GEAR INNER CYLINDER REMAINS FULLY EXTENDED DURING THE RETRACTION. CAN CAUSE DAMAGE TO THE AIRPLANE.

(e) Once you have jacked the airplane and the nose gear tires are raised off the ground, use nitrogen pressure to inflate the nose gear strut to a pressure between 150 psi and 250 psi.

NOTE: Once the nose gear strut is charged with nitrogen per the above instructions, you can continue jacking the airplane further.



DO NOT LIFT THE NOSE OF THE AIRPLANE TO MORE THAN SIX INCHES OF TIRE CLEARANCE. IF YOU LIFT THE NOSE HIGHER THAN SIX INCHES, SIDE LOADS THAT ARE MORE THAN DESIGN LOAD LIMITS CAN OCCUR. THIS CAN CAUSE DAMAGE TO THE JACK RAM AND JACK ADAPTER BECAUSE THEY WILL MOVE IN AN ARC.

(f) Lift the airplane nose to the necessary height.



FAILURE TO INSTALL THE MAIN LANDING GEAR WHEEL CHOCKS AND APPLY THE PARKING BRAKE CAN RESULT IN INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE.

- 1) Install the main landing gear wheel chocks and apply the parking brake.
- G. Lift the airplane nose with a nose jack after the inner cylinder is retained by retention strap.

SUBTASK 07-11-02-860-006

(1) Put the nose landing gear in its center position.

SUBTASK 07-11-02-860-007



MAKE SURE THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE THE SHOCK STRUT IS DEFLATED. IF YOU DO NOT OBEY THESE INSTRUCTION, DAMAGE TO THE AIRPLANE CAN OCCUR.

(2) To deflate the shock strut of the nose landing gear, do this task: Nose Landing Gear Shock Strut Servicing, TASK 12-15-02-610-805-002.

SUBTASK 07-11-02-480-004



DO NOT USE THE INNER CYLINDER RETENTION STRAP ON INFLATED SHOCK STRUTS. THE RETENTION STRAP HAS A LOAD LIMIT.

(3) Install the retention strap retainer equipment, SPL-1853.

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SUBTASK 07-11-02-580-002



MAKE SURE YOU KEEP THE AIRPLANE WEIGHT AND CENTER OF GRAVITY WITHIN THE CORRECT LIMITS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, STRUCTURAL DAMAGE TO THE AIRPLANE CAN OCCUR.

(4) To lift the airplane nose, do the steps that follow (Figure 202):

NOTE: Loosen the wheel chocks and release the parking brake during the jacking procedure. When the airplane is at the necessary height, install the wheel chocks and apply the parking brake.

- (a) Loosen the wheel chocks and release the parking brake.
- (b) Put the jack directly below the jack pad at Jack Point D (Figure 201).
- (c) Make sure that the jack is level and in the center of the jack adapter.
- (d) Operate the jack to set the jack in the jack adapter.

NOTE: Refer to the specified jack manufacturers' instructions.



DO NOT LIFT THE NOSE OF THE AIRPLANE TO MORE THAN SIX INCHES OF TIRE CLEARANCE. IF YOU LIFT THE NOSE HIGHER THAN SIX INCHES, SIDE LOADS THAT ARE MORE THAN DESIGN LOAD LIMITS CAN OCCUR. THIS CAN CAUSE DAMAGE TO THE JACK RAM AND JACK ADAPTER BECAUSE THEY WILL MOVE IN AN ARC.

(e) Lift the airplane nose to the necessary height.



FAILURE TO INSTALL THE MAIN LANDING GEAR WHEEL CHOCKS AND APPLY THE PARKING BRAKE CAN RESULT IN INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE.

1) Install the main landing gear wheel chocks and apply the parking brake.

#### H. Put the Airplane Back to Its Usual Condition

SUBTASK 07-11-02-580-003



DO NOT GET THIS MATERIAL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. PUT ON A RESPIRATOR, EYE PROTECTION (GOGGLES, OR OTHER APPROVED PROTECTION), AND GLOVES BEFORE YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Do the steps that follow to lower the airplane nose off of the jack:



MAKE SURE THE AREA BELOW THE AIRPLANE IS CLEAR OF ALL EQUIPMENT BEFORE THE AIRPLANE IS LOWERED. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE AIRPLANE CAN OCCUR.

- (a) Make sure the area below the airplane is clear.
- (b) Make sure the landing gear control lever is in the DN position.

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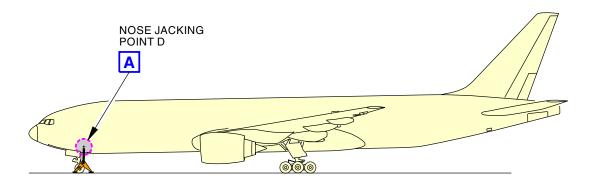
- (c) Lower the jack until the jack is at the bottom or until the airplane weight is on the nose landing gear.
- (d) Move the jack away from the airplane.
- (e) Remove the jack adapter.
  - 1) Apply corrosion inhibiting material, G50136 (preferred) or Mastinox 6856 K, C50056 (alternate) to the filler bolts (8).
  - 2) Install the filler bolts (8) at jack point D (Figure 201) on the fuselage.
    - a) Torque the filler bolts to 220 in-lb (25 N·m) 245 in-lb (28 N·m).

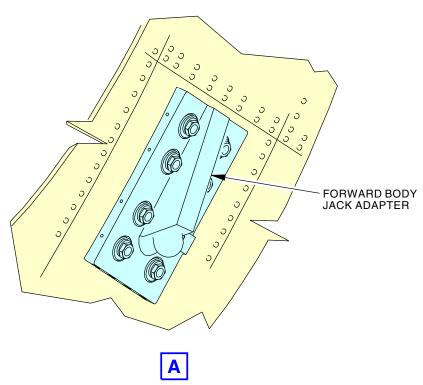
SUBTASK 07-11-02-610-003

(2) Do this task: Nose Landing Gear Shock Strut Servicing, TASK 12-15-02-610-805-002.

----- END OF TASK -----







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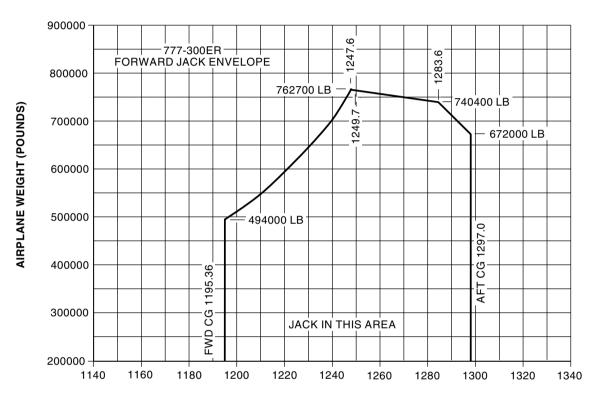
# Airplane Nose Jacking Point and Jacking Adapter Figure 201/07-11-02-990-801

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## **AIRPLANE BODY STATION CG (INCHES)**

777-300ER

NOTE:

THE AIRPLANE MAIN LANDING GEAR REMAINS ON THE GROUND.

M94770 S0006399042\_V2

Airplane Weight and Center of Gravity Limits for Jacking at Forward Body Jack Point Figure 202/07-11-02-990-805

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## **JACKING AIRPLANE AXLES - MAINTENANCE PRACTICES**

#### 1. General

- A. This procedure has the following tasks:
  - (1) Lift the Airplane with Axle Jacks.
  - (2) Main landing Gear Axle Lifting for Deflated Tires Emergency Jacking.
    - (a) Low clearance jacks.
    - (b) MLG emergency jacking equipment, SPL-1493.
  - (3) Nose landing Gear Axle Lifting for Deflated Tires Emergency jacking.
- B. This section gives instructions to lift the airplane at the axles.
  - (1) The airplane has seven axle jack points.
    - (a) Three axle jack points are on each main landing gear.
    - (b) One axle jack point is on the nose landing gear.
  - (2) The pads of the axle jack point are all part of the landing gear.

NOTE: The jack pad in the tow fitting can be removed.

C. You can lift the airplane on one axle or on a combination of axles.



YOU MUST USE AXLE JACKS ON THE FORWARD AND AFT JACK POINTS ON THE MAIN LANDING GEAR TO CHANGE THE CENTER TIRES. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DAMAGE TO THE MAIN LANDING GEAR.



DO NOT JACK THE AIRPLANE HIGH ENOUGH AT ONLY ONE MAIN LANDING GEAR AXLE (FORWARD OR AFT) TO CHANGE THE CENTER TIRES. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DAMAGE TO THE MAIN LANDING GEAR.

- (1) If you use a jack on one axle, the airplane can be lifted in winds up to 35 knots.
- (2) When two jacks are used on the same truck (forward and aft axle jack points) you can lift the airplane in winds up to 35 knots.
- (3) When you use axle jacks on the landing gear as shown below, the airplane cannot be lifted in winds more than 25 knots:
  - (a) the two trucks of the main landing gear
  - (b) one truck of the main landing gear and the nose landing gear.
- D. The steps that follow show what can prevent the use of axle jacks.
  - (1) Two flat tires on the same axle can prevent the use of standard bottle type or cantilever type axle jacks in which case emergency jacks must be used, (Figure 201).

NOTE: If you do not have the necessary height, the Emergency Jacks will be necessary to lift the axle sufficiently to install the axle jack.

- (2) Six flat tires on the same truck can prevent the use of standard bottle type or cantilever type axle jacks (Figure 202).
  - (a) It can be possible to lift the airplane with a cantilever type axle jack.

NOTE: Emergency Jacks will be necessary to lift the axle sufficiently to install the axle jack if you cannot use a standard cantilever type jack.

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E. You can estimate the axle jack necessary capacity when you use the aircraft gross weight with (Figure 203).

### TASK 07-11-03-580-801

## 2. Lift the Airplane with Axle Jacks

#### A. General



MOVEMENT OF CARGO INTO OR OUT OF THE AIRPLANE WHILE THE AXLES ARE ON JACKS CAN CAUSE A CHANGE IN THE CENTER OF GRAVITY AND CAUSE A HIGH LOAD ON THE AXLE JACKS. IT CAN ALSO CAUSE THE AIRPLANE TO FALL OFF THE JACKS. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.



BE CAREFUL IN HIGH WINDS. DO NOT USE JACKS TO LIFT THE AIRPLANE IN VERY HIGH WINDS (MORE THAN 40 MPH, 35 KNOTS OR 64 KM/HOUR).

(1) Obey this warning during all of this task.

#### B. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
32-00-30-480-801	Landing Gear Downlock Pins Installation (P/B 201)

## C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1486	Jack - Axle, Flyaway
	Part #: 5007-56FT Supplier: 00994
	Part #: 6510-56FT Supplier: 00994
	Part #: 9510-56FT Supplier: 00994
	Opt Part #: 7193-010 Supplier: 00994
	Opt Part #: 9332-011 Supplier: 00994
	Opt Part #: 9349-010 Supplier: 00994
COM-1488	Jack - Axle
	Part #: 2265-10PR Supplier: 00994
	Part #: 95P10AR Supplier: 94861
	Part #: RT6050 Supplier: D2029
	Part #: RT9050 Supplier: D2029
	Opt Part #: RA6007 Supplier: D2029
	Opt Part #: RA7704-002
	Opt Part #: RA9003 Supplier: D2029
COM-1502	Chocks - Wheel
	Part #: W88 Supplier: 9L752

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### (Continued)

Reference	Description
COM-1505	Chocks - Wheel
	Part #: AC6820-LR Supplier: 032T9 Part #: PF10-010 Supplier: 3D5B2 Part #: W88 Supplier: 9L752
STD-1485	Jack - Axle

#### D. Location Zones

Zone	Area
700	Landing Gear and Landing Gear Doors

## E. Prepare to Lift the Airplane with Axle Jacks

SUBTASK 07-11-03-580-020

(1) Make sure the parking brake is set.

SUBTASK 07-11-03-840-001

(2) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-30-480-801.

SUBTASK 07-11-03-860-001

(3) Make sure the airplane center of gravity is within the airplane limit (Figure 204).

SUBTASK 07-11-03-580-001



IF HIGH WINDS ARE POSSIBLE, OBEY THE INSTRUCTIONS IN THIS TASK. HIGH WINDS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO THE AIRPLANE



DO NOT LIFT THE AIRPLANE IN WINDS MORE THAN 25 KNOTS IF YOU USE AXLE JACKS ON THE TWO TRUCKS OF THE MAIN LANDING GEAR OR ONE TRUCK OF THE MAIN LANDING GEAR AND THE NOSE LANDING GEAR. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE AIRPLANE CAN OCCUR.

(4) If it is possible, turn the airplane into the wind when it is out of the hangar for jacking the airplane axles.

#### SUBTASK 07-11-03-580-002



MOVE THE AIRPLANE STRAIGHT FORWARD FOR A MINIMUM OF 10 FEET (3 M) BEFORE YOU LIFT IT ON THE JACKS. DO THIS WHEN THE AIRPLANE IS STOPPED DURING A TURN. SIDE LOAD PRESSURES ON THE LANDING GEAR TRUCKS CAUSED BY SCRUBBED TIRES CAN CAUSE THE AXLE JACK TO FALL.

(5) Make sure the torsion loads (side load pressures) are released before the airplane axles are lifted on jacks.

#### SUBTASK 07-11-03-580-021

(6) Move the airplane a minimum of 10 ft (3 m) straight forward before you lift the airplane on jacks.

#### SUBTASK 07-11-03-610-001

(7) Make sure the shock struts are inflated.

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F. Lift the Airplane at the Axles, with the Axle Jacks when the Tires are Inflated

SUBTASK 07-11-03-580-003



YOU MUST USE AXLE JACKS ON THE FORWARD AND AFT JACK POINTS ON THE MAIN LANDING GEAR TO CHANGE THE CENTER TIRES. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DAMAGE TO THE MAIN LANDING GEAR.



DO NOT JACK THE AIRPLANE HIGH ENOUGH AT ONLY ONE MAIN LANDING GEAR AXLE (FORWARD OR AFT) TO CHANGE THE CENTER TIRES. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DAMAGE TO THE MAIN LANDING GEAR

- (1) When the tires are not deflated, put the following jack(s) directly below the jack pad(s) on the landing gear axles (Figure 202).
  - (a) Flyaway Axle Jack, COM-1486.
  - (b) axle jack, COM-1488.
  - (c) MLG axle jack, STD-1485.

#### SUBTASK 07-11-03-580-022

(2) Examine all of the wheels on the axles that are not being lifted with the jack.

#### SUBTASK 07-11-03-480-006

- (3) Install the wheel chocks, COM-1505, on one set of wheels on each shock strut that is not being lifted with the jack.
  - (a) Do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.
  - (b) If the ramp does not slope, move the aft NLG chocks away from the tires.

NOTE: During the refuel, the NLG tires roll aft as the MLG shock absorber compresses.

- 1) Make sure that the chocks do not touch the MLG tires.
  - NOTE: The weight of the fuel can lower the aircraft and cause the tires to catch the chocks.
- (c) If the ramp slopes, make sure that the chocks down from the tires touch the NLG and MLG tires.
  - 1) Make sure that the chocks up from the tires do not touch the NLG and MLG tires.

#### SUBTASK 07-11-03-580-023

(4) Release the parking brake.

SUBTASK 07-11-03-580-024



YOU MUST USE AXLE JACKS ON THE FORWARD AND AFT JACK POINTS ON THE MAIN LANDING GEAR TO CHANGE THE CENTER TIRES. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DAMAGE TO THE MAIN LANDING GEAR.

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## (CAUTION PRECEDES)



DO NOT JACK THE AIRPLANE HIGH ENOUGH AT ONLY ONE MAIN LANDING GEAR AXLE (FORWARD OR AFT) TO CHANGE THE CENTER TIRES. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DAMAGE TO THE MAIN LANDING GEAR

- (5) Operate the axle jack(s) to lift the airplane wheel(s) to the necessary height (Figure 202).
  - NOTE: Refer to the jack manufacturers' instructions.
  - (a) Make sure the jack point loads are not more than specified limits (Figure 203).
  - (b) Make sure that you raise the forward and aft jacks at the same time.
    - NOTE: If you do not raise the forward and aft jacks at the same time, it can cause loads in the forward and aft direction and can cause the jack to stop moving.
  - (c) If the axle jack locks unexpectedly, check the airplane center of gravity to make sure that it is within the approved limits (Figure 204).

NOTE: You can use a jack with a swivel head to decrease jacking problems.



IF THERE ARE STRONG WINDS, OBEY THESE STEPS BEFORE YOU LIFT THE AIRPLANE. WIND CAN CAUSE THE AIRPLANE TO TURN THE AXLE. DAMAGE TO THE AXLE CAN OCCUR.



MAKE SURE YOU RELEASE THE AIRCRAFT PARKING BRAKE BEFORE YOU LOWER THE AIRCRAFT. THIS WILL HELP PREVENT DAMAGE TO THE LANDING GEAR.

- (d) If there are gusty crosswinds while the nose gear is on the axle jack, apply the parking brakes to decrease the airplane movement.
  - 1) Release the parking break before lowering the airplane.
- (e) Make sure the jack point loads are not more than specified limits (Figure 203).
- (f) Make sure that you raise the forward and aft jacks at the same time.
  - NOTE: If you do not raise the forward and aft jacks at the same time, it can cause loads in the forward and aft direction and can cause the jack to stop moving.
- (g) If the axle jack locks unexpectedly, check the airplane center of gravity to make sure that it is within the approved limits (Figure 204).

NOTE: You can use a jack with a swivel head to decrease jacking problems.

### G. Put the Airplane Back to its Usual Condition

SUBTASK 07-11-03-840-011

Make sure that the area below the airplane is clear of all personnel and equipment.



OBEY THE MANUFACTURER'S INSTRUCTIONS WHEN YOU OPERATE THE JACKS. IF YOU IGNORE THE INSTRUCTIONS, INJURIES TO PERSONNEL AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

(2) Lower the airplane off the axle jacks.

NOTE: Refer to the jack manufacturer's instructions.

(3) Install the wheel chocks, chocks, COM-1502.

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(4) Remove all jack equipment from below forward and aft axles.

END	<b>OF TASK</b>	
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### TASK 07-11-03-580-802

## 3. Main Landing Gear Axle Lifting for Deflated Tires - Emergency Jacking

### A. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
32-42-05-020-801	In-Axle Assembly Removal (P/B 401)
32-42-05-400-801	In-Axle Assembly Installation (P/B 401)
32-45-01-000-801	Main Landing Gear Wheel and Tire Assembly Removal (P/B 401)

## B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1486	Jack - Axle, Flyaway
	Part #: 5007-56FT Supplier: 00994 Part #: 6510-56FT Supplier: 00994 Part #: 9510-56FT Supplier: 00994 Opt Part #: 7193-010 Supplier: 00994 Opt Part #: 9332-011 Supplier: 00994 Opt Part #: 9349-010 Supplier: 00994
COM-1488	Jack - Axle
	Part #: 2265-10PR Supplier: 00994 Part #: 95P10AR Supplier: 94861 Part #: RT6050 Supplier: D2029 Part #: RT9050 Supplier: D2029 Opt Part #: RA6007 Supplier: D2029 Opt Part #: RA7704-002 Supplier: D2029 Opt Part #: RA9003 Supplier: D2029
COM-1505	Chocks - Wheel
	Part #: AC6820-LR Supplier: 032T9 Part #: PF10-010 Supplier: 3D5B2 Part #: W88 Supplier: 9L752
SPL-1493	Equipment - Jacking, Main Landing Gear Axle (Emergency Conditions)  Part #: J07013-1 Supplier: 81205
STD-1485	Jack - Axle

## C. Location Zones

Zone	Area
700	Landing Gear and Landing Gear Doors

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D. Use Low clearance jacks, and follow the procedure in the previous paragraph, and lift the airplane at the main landing gear axles with low clearance emergency axle jacks per the data in

(Figure 202).

NOTE: If low clearance axle jacks do not comply with the data in (Figure 202) or are not available, an emergency jack beam assembly must be used, MLG emergency jacking equipment, SPL-1493, or equivalent.

NOTE: The alternate, MLG emergency jacking equipment, SPL-1493, is used for conditions where there is insufficient clearance and interference from flat tire(s), making it impossible to use the low clearance emergency axle jacks or the MLG emergency jacking equipment, SPL-1493.

#### SUBTASK 07-11-03-890-001

- (1) Use the following, or equivalent, low clearance axle jacks:
  - (a) MLG axle jack, STD-1485 used with axle jack, COM-1488

#### SUBTASK 07-11-03-890-002

- (2) Prepare the airplane to install the jack on the aft and forward axle of the main landing gear (Figure 201).
  - (a) Install the wheel chocks, COM-1505 on one set of wheels, on each shock strut that is not being lifted with the jack, do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.
  - (b) Release the parking brake.

#### SUBTASK 07-11-03-960-003

(3) Replace the wheel/tire assembly, do this task: Main Landing Gear Wheel and Tire Assembly Removal, TASK 32-45-01-000-801.

#### SUBTASK 07-11-03-580-011

- (4) Lower the airplane off of the axle jack.
- E. Lift the Airplane at the Main Landing Gear Axles with the Emergency Jack Beam Assembly or equivalent.

NOTE: When the tires are deflated on the landing gear axle (not sufficient clearance to install the axle jack), do the steps that follow (Figure 201, Figure 202).

### SUBTASK 07-11-03-580-012

- (1) Prepare the airplane to install the emergency jack beam assembly, MLG emergency jacking equipment, SPL-1493, on the aft or forward axle of the main landing gear (Figure 205).
  - (a) Install the wheel chocks, COM-1505 on one set of wheels, on each shock strut that is not being lifted with the jack.
    - 1) Do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.
  - (b) Release the parking brake.
  - (c) Make sure the trucks are centered so the forward or aft U-bolts [12] of the emergency jack beam assembly can be installed correctly.

## SUBTASK 07-11-03-020-004

- (2) Prepare the aft axle of the main landing gear to install the emergency jack beam assembly (Figure 205).
  - (a) Remove four bolts [5] from the bracket that holds the aft hydraulic support arm [1] on the top center of the aft axle [6].

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- 1) Lay the aft hydraulic support arm [1] to one side to get the necessary clearance to install the emergency jack beam assembly [9].
  - a) Do not disconnect the hydraulic fittings.
- (b) Remove the steering actuator bolt [3] that holds the forward eye bolt of the steering actuator [4].
  - 1) Make sure you turn the steering actuator lever [2] to the off position.
  - 2) Move the forward end of the steering actuator [4] to one side to get the necessary clearance to install the emergency jack beam assembly [9].
- (c) Remove the two clamps [7] from around the axle (one on each side of the axle housing).
  - Remove the bolts securing the brackets and turn the brackets to gain clearance.

SUBTASK 07-11-03-480-003



MAKE SURE THAT YOU USE THE EMERGENCY JACK BEAM ASSEMBLY CORRECTLY. IF YOU DO NOT USE IT CORRECTLY, YOU CAN CAUSE DAMAGE TO THE AXLE.

- (3) Install the emergency jack beam assembly [9] or equivalent, on the aft axle of the main landing gear MLG emergency jacking equipment, SPL-1493.
  - NOTE: The alternate, MLG emergency jacking equipment, SPL-1493, is used for conditions where there is insufficient clearance and interference from flat tire(s), making it impossible to use the low clearance emergency axle jacks or the emergency jack beam assembly, MLG emergency jacking equipment, SPL-1493.
  - (a) Put the jack beam assembly [9] on the top of the main landing gear axle.
  - (b) Slide the rings with the slots (elongated holes) from the jack beam assembly [9] kit on to the adapter.
    - NOTE: These slotted rings are to be used on the rear axle only.
  - (c) Install the forward or aft U-bolts [12] from below the axle and position around the slotted rings and through the bolt holes of the fitting assembly.
    - 1) Make sure you use the correct forward or aft U-bolts [12]. L.H. for the left and R.H. for the right.
    - 2) Tighten and loosen the nuts [11] so they can move when the jack beam assembly [9] is rotated.
  - (d) Put the two stand assemblies [10] below the two aft points of the jack beam assembly [9].
    - 1) Rotate the jack beam assembly [9] (up on the front and down at the aft) so the stands can be installed at their greatest height.
  - (e) Install the jack at the jack point [13].
  - (f) Lift the airplane to the height necessary to install the axle jack.
  - (g) Put shoring material below the wheels to keep the necessary height for the installation of the axle jack.

#### F. Forward Axle

SUBTASK 07-11-03-020-005

- (1) Prepare the forward axle of the main landing gear to install the emergency jack beam assembly [9] (Figure 205).
  - (a) Remove the bolt [8] from the support arm [14].

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(b) Remove the brake line quick-disconnect [15] at the axle and move the support arm [14] up and away.

#### SUBTASK 07-11-03-480-004



MAKE SURE THAT YOU USE THE EMERGENCY JACK BEAM ASSEMBLY CORRECTLY. IF YOU DO NOT USE IT CORRECTLY, YOU CAN CAUSE DAMAGE TO THE AXLE.

- (2) Install the emergency jack beam assembly [9] on the forward axle of the main landing gear MLG emergency jacking equipment, SPL-1493 or equivalent.
  - NOTE: The alternate, MLG emergency jacking equipment, SPL-1493, is used for conditions where there is insufficient clearance and interference from flat tire(s), making it impossible to use the low clearance emergency axle jacks or the emergency jack beam assembly, MLG emergency jacking equipment, SPL-1493.
  - (a) Put the jack beam assembly [9] on the top of the forward main landing gear axle.
  - (b) Slide the non-slotted rings from the adapter kit on to the adapter.
    - NOTE: These rings are non-slotted and are to be used on the forward axle only.
  - (c) Install the forward or aft U-bolts [12] from below the axle and position around the rings and through the bolt holes of the fitting assembly.
    - 1) Make sure you use the correct forward or aft U-bolts [12]. L.H. for the left and R.H. for the right.
    - 2) Tighten and loosen the nuts [11] so they can move when adapter is rotated.
  - (d) Put the two stand assemblies [10] below the two aft points of the jack beam assembly [9].
    - 1) Rotate the adapter (up on the front and down on the aft) so the stands can be installed at their greatest height.
  - (e) Install the jack at the jack point [13].
  - (f) Lift the airplane to the height necessary to install the axle jack.
  - (g) Put shoring material below the wheels to keep the necessary height for the installation of the axle jack.

#### SUBTASK 07-11-03-580-013

- (3) Lift the airplane with the axle jack.
  - (a) Put the applicable axle jack below the jack pad.
    - 1) Flyaway Axle Jack, COM-1486.
    - 2) axle jack, COM-1488.
    - 3) MLG axle jack, STD-1485.
  - (b) Operate the axle jack(s) to lift the airplane wheel(s) to the necessary height.

### SUBTASK 07-11-03-080-003

- (4) Remove the emergency jack beam assembly equipment (Figure 205).
  - (a) Remove the shoring material.
  - (b) Remove the two stand assemblies [10] below the two aft points of the jack beam assembly [9].
  - (c) Loosen the nuts [11].
  - (d) Remove the forward or aft U-bolts [12] from around the axle and through the bolt holes of the fitting assembly.

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(e) Remove the jack beam assembly [9] from the top of the main landing gear axle (aft or forward axle).

#### SUBTASK 07-11-03-840-004

- (5) Put the aft landing gear axle back to its usual condition (Figure 205).
  - (a) Put the two clamps [7] around the axle (one on each side of the axle housing).
    - 1) Turn the brackets and install the bolts.
  - (b) Move the forward end of the steering actuator [4] into position to install the steering actuator bolt [3].
    - 1) Install the steering actuator bolt [3] that holds the forward eye bolt of the steering actuator [4].
    - 2) Make sure you turn the steering actuator lever [2] to the on position.
  - (c) Put the aft hydraulic support arm [1] into position and install four bolts [5] on to the bracket.

#### SUBTASK 07-11-03-840-005

- (6) Put the forward landing gear axle back to its usual condition (Figure 205).
  - (a) Move the support arm [14] back to its proper position and reconnect the brake line quick-disconnect [15] at the axle.
  - (b) Install the bolt [8] to the support arm [14].

#### SUBTASK 07-11-03-960-004

(7) Replace the wheel/tire assembly, do this task: Main Landing Gear Wheel and Tire Assembly Removal. TASK 32-45-01-000-801.

#### SUBTASK 07-11-03-580-014

- (8) Lower the airplane off of the axle jack.
- G. Lift the Airplane at the Main Landing Gear Axles with the Emergency Jack Beam Assembly or equivalent.

<u>NOTE</u>: When the tires are deflated on the landing gear axle (not sufficient clearance to install the axle jack), do the steps that follow (Figure 201, Figure 202).

#### SUBTASK 07-11-03-020-006

- (1) Prepare the airplane to install the emergency jack beam assembly on the main landing gear, MLG emergency jacking equipment, SPL-1493, or equivalent, until another jack can be placed at the normal jack point (Figure 206).
  - (a) Install the emergency jack beam assembly in the front and center axles or the rear and center axles (Figure 206).
  - (b) Install the wheel chocks, COM-1505 on one set of wheels, on each shock strut that is not being lifted with the jack.
    - 1) Do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.
  - (c) Release the parking brake.

## SUBTASK 07-11-03-840-008

**EFFECTIVITY** 

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- (2) Prepare either end and the center of both sides of the main landing gear truck to install the emergency jack beam assembly (Figure 206).
  - (a) To remove the in-axle assembly, do this task: In-Axle Assembly Removal, TASK 32-42-05-020-801.



#### SUBTASK 07-11-03-480-005



MAKE SURE THAT YOU USE THE EMERGENCY JACK BEAM ASSEMBLY CORRECTLY. IF YOU DO NOT USE IT CORRECTLY, YOU CAN CAUSE DAMAGE TO THE AXLE.

- (3) Install the emergency jack beam bar assembly in the forward and center axles, or the aft and center axles, on both sides of the main landing gear MLG emergency jacking equipment, SPL-1493, or equivalent.
  - (a) Install the jack beam bar assembly [16] into the main landing gear axles.
  - (b) Install the jack beam assembly [17] onto the jack beam bar assembly [16].
  - (c) Install a T-pin [18] through each hole in the beam assembly [17] and the bar assembly [16] which will lock the two assemblies together.
  - (d) Install a jack at each of the emergency jack beam assembly jack points [19] (Figure 206).
  - (e) Use both jacks to lift the airplane to the height necessary to install the axle jack.

#### SUBTASK 07-11-03-580-018

- (4) Lift the airplane with the axle jack.
  - (a) Put the following, or equivalent, axle jack below the jack pad.
    - 1) Flyaway Axle Jack, COM-1486.
    - 2) axle jack, COM-1488.
    - 3) MLG axle jack, STD-1485.
  - (b) Operate the axle jack(s) to lift the airplane wheel(s) to the necessary height.

### SUBTASK 07-11-03-840-006

(5) Put the aft landing gear axle back to its usual condition (Figure 206).

#### SUBTASK 07-11-03-840-007

- (6) Put the main landing gear axle back to its usual condition.
  - (a) Lower and remove the jack from the beam assembly jack point (Figure 206).
  - (b) Remove each T-pin [18] from the each axle beam assembly [17].
  - (c) Remove the beam assembly [17].
  - (d) Remove the bar assembly [16].

#### SUBTASK 07-11-03-960-006

(7) To replace the wheel/tire assembly, do this task: Main Landing Gear Wheel and Tire Assembly Removal, TASK 32-45-01-000-801.

## SUBTASK 07-11-03-410-001

(8) To install the in-axle assembly, do this task: In-Axle Assembly Installation, TASK 32-42-05-400-801.

#### SUBTASK 07-11-03-580-019

(9) Lower the airplane off of the axle jack.

——— END OF TASK ———

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EFFECTIVITY .



#### TASK 07-11-03-580-803

## 4. Nose Landing Gear Axle Lifting for Deflated Tires - Emergency Jacking

#### A. References

Reference	Title
10-11-05-500-801	Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots (P/B 201)
32-45-02-000-801	Nose Landing Gear Wheel and Tire Assembly Removal (P/B 401)

### B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1486	Jack - Axle, Flyaway
	Part #: 5007-56FT Supplier: 00994 Part #: 6510-56FT Supplier: 00994 Part #: 9510-56FT Supplier: 00994 Opt Part #: 7193-010 Supplier: 00994 Opt Part #: 9332-011 Supplier: 00994 Opt Part #: 9349-010 Supplier: 00994
COM-1505	Chocks - Wheel
	Part #: AC6820-LR Supplier: 032T9 Part #: PF10-010 Supplier: 3D5B2 Part #: W88 Supplier: 9L752
SPL-1492	Equipment - Emergency Jacking, Nose Landing Gear
	Part #: J07004-59 Supplier: 81205

#### C. Location Zones

Zone	Area	
700	Landing Gear and Landing Gear Doors	

## D. Lift the airplane at the nose landing gear axle with the Emergency Jack Assembly

NOTE: When the tires are deflated on the landing gear axle (not sufficient clearance to install the axle jack), do the steps that follow.

SUBTASK 07-11-03-580-015



MAKE SURE THAT YOU USE THE EMERGENCY JACK BEAM ASSEMBLY CORRECTLY. IF YOU DO NOT USE IT CORRECTLY, YOU CAN CAUSE DAMAGE TO THE AXLE.

- (1) Lift the nose landing gear with the emergency jack beam assembly [20] (Figure 207).
  - (a) Install the emergency jack beam assembly [20] on the nose landing gear using NLG emergency jacking equipment, SPL-1492.
    - 1) Put the emergency jack beam assembly [20] above the nose landing gear axle from the front end of the nose landing gear.
      - a) Put the bar [21] on the back side of the emergency jack beam assembly [20] and install two pins [22] into the bar [21].

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- b) Put the two pin assemblies [23] through the front top of the emergency jack beam assembly [20].
- (b) Put the applicable axle jack below the jack pad [24] using Flyaway Axle Jack, COM-1486.
  - 1) Make sure the jack point limits are not more than the specified limit (Figure 201).
- (c) Operate the axle jack to lift the nose wheels to the necessary height.

#### SUBTASK 07-11-03-960-005

(2) Replace the wheel/tire assembly, do this task: Nose Landing Gear Wheel and Tire Assembly Removal, TASK 32-45-02-000-801.

#### SUBTASK 07-11-03-580-016

(3) Lower the airplane off of the axle jack.

#### SUBTASK 07-11-03-080-004

(4) Remove the emergency jack beam assembly [20] (Figure 207).

## E. Put the Airplane Back to Its Usual Condition

#### SUBTASK 07-11-03-580-017

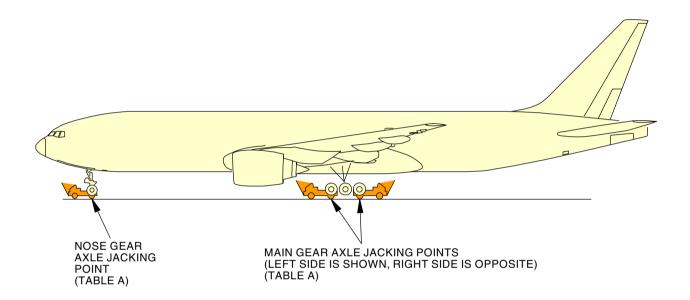
- (1) Lower the airplane off of the axle jack(s).
  - (a) Refer to the jack manufacturers' instructions.
  - (b) Remove the axle jack(s) from below the axle.
  - (c) Install the wheel chocks, COM-1505, do this task: Chock Installation in Winds or Wind Gusts to a Maximum of 35 Knots, TASK 10-11-05-500-801.

----- END OF TASK -----

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EFFECTIVITY -





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Axle Jacking System Specifications Figure 201/07-11-03-990-801 (Sheet 1 of 3)

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	MAXIMUM JACK LOAD PER AXLE, LB (KG)	LOCATION		JACK POINT HEIGHT		ADAPTER	
		B STA	BBL	WL	MINIMUM INCHES	EXTENDED INCHES	FITTING REQUIRED
MLG FWD	166,400 (75,477)	1496.69	214.78	12.11	3	3	NO
MLG AFT	157,000 (71,214)	1610.69	214.83	9.9	3	3	NO
MLG AFT TOW FTG	147,500 (66,904)	1618.00	214.85	13.8	3	3	NO
NOSE GEAR	71,300 (32,341)	324.5	0	11.59	3	3	NO

### **TABLE A**

THE LOAD WHILE JACKING BOTH ENDS OF THE TRUCK SIMULTANEOUSLY, USING THE JACKING POINT INSTALLED IN THE AFT TOW FITTING AND FORWARD AXLE JACKING POINT, USING THE MAC AFT AND FWD CG
2 THE LOAD WHILE JACKING ONE END OF THE TRUCK ONLY USING THE MAC AFT CG
REFER TO FIG. 202 FOR AXLE JACK HEIGHTS
4 662,000 LB (300,278 KG), 38.5% MAC AFT CG AND 14% MAC FWD CG LIMIT

D63896 S0000162319\_V3

Axle Jacking System Specifications Figure 201/07-11-03-990-801 (Sheet 2 of 3)

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JACKING POINT	MAXIMUM JACK LOAD PER AXLE, LB (KG)	LOCATION		JACK POINT HEIGHT		ADAPTER	
		B STA	BBL	WL	MINIMUM INCHES	EXTENDED INCHES	FITTING REQUIRED
MLG FWD	191,260 (86,754)	1496.49	214.78	11.4	3	3	NO
MLG AFT	178,150 (80,807)	1611.69	214.81	9.03	3	3	NO
MLG AFT TOW FTG	167,540 (75,994)	1618.99	214.85	14.01	3	3	NO
NOSE GEAR	75,500 (34,246)	324.5	0	10.5	3	3	NO

### **TABLE A**

1	THE LOAD WHILE JACKING BOTH ENDS OF THE TRUCK SIMULTANEOUSLY, USING THE JACKING POINT INSTALLED IN THE AFT TOW FITTING AND FORWARD AXLE JACKING POINT, USING THE MAC AFT AND FWD CG
2	THE LOAD WHILE JACKING ONE END OF THE TRUCK ONLY USING THE MAC AFT CG

REFER TO FIG. 202 FOR AXLE JACK HEIGHTS

4 777,000 LB (352,441 KG), 27.4% MAC AFT CG AND 22% MAC FWD CG LIMIT

D63908 S0000162320\_V3

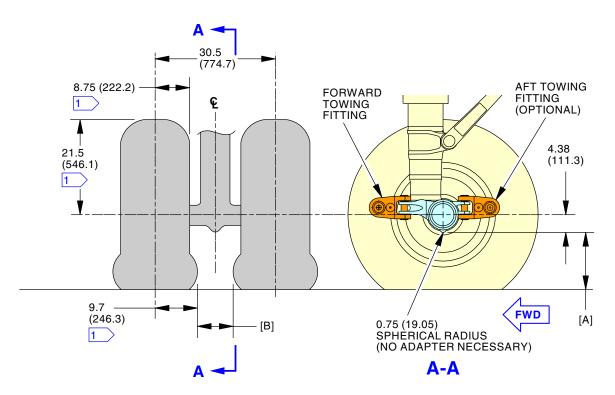
Axle Jacking System Specifications Figure 201/07-11-03-990-801 (Sheet 3 of 3)

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CONDITION	43x17	SIZE 7.5R17 PLY
	[A]	[B]
Maximum Taxi Weight - Normal Inflation	13.39 (340.1)	11.10 (281.9)
Both Tires Flat	6.79 (172.5)	8.90 (226.1)
One Tire Flat	10.37 (263.4)	9.90 (251.5)
On Wheel Rims	5.82 (147.8)	14.25 (362.0)
On Jacks for Tire Change - Tires Inflated, 2.00 (50.8) Ground Clearance	19.90 (505.5)	

## NOTE:

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES).

NOMINAL DIMENSION

777-300ER

N01420 S0006399057\_V2

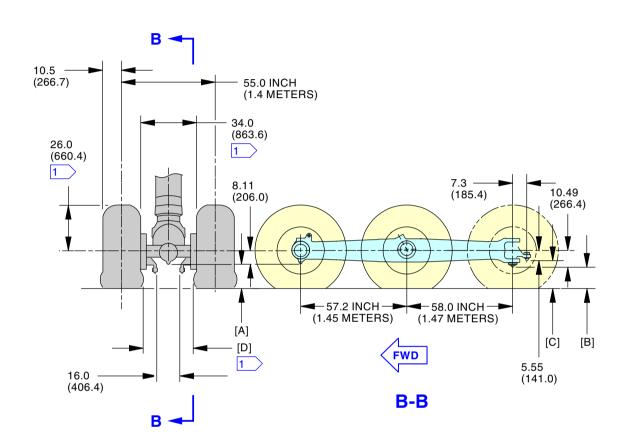
Landing Gear Axle Jack Points
Figure 202/07-11-03-990-802 (Sheet 1 of 3)

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## NOTE:

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES).



NOMINAL DIMENSION

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Landing Gear Axle Jack Points Figure 202/07-11-03-990-802 (Sheet 2 of 3)

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CONDITION	TIRE SIZE 52x21.0R22 36PR			
	[A]	[B]	[C]	[D]
Maximum Taxi Weight - Normal Tire Inflation	13.20 (335.2)	11.02 (279.9)	15.96 (405.3)	31.6 (802.6)
Both Tires on Forward Axle Flat	4.85 (123.1)	13.04 (331.2)	18.64 (473.4)	29.4 (746.7)
Forward Jacking to Change Forward Tires 2	19.82 (503.4)			
Both Tires on Aft Axle Flat	15.34 (389.6)	2.55 (64.7)	6.83 (173.4)	29.4 (746.7)
Aft Jacking to Change Aft Tires 2		17.44 (442.9)	22.85 (580.3)	
Forward and Aft Jacking to Change Center Tires	20.15 (511.8)	17.77 (451.3)	22.71 (576.8)	
6 Flat Tires - Not on Rims	5.67 (144.0)	3.46 (87.8)	8.40 (213.3)	29.4 (746.7)
6 Flat Tires - On Rims	4.65 (118.1)	2.44 (61.9)	7.38 (187.4)	

## NOTE:

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES).

1 NOMINAL DIMENSION

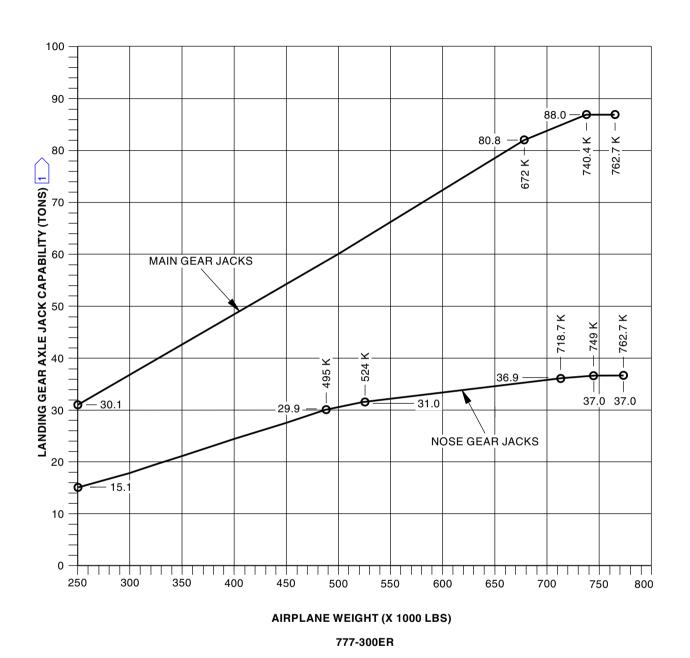
PROVIDES 1 INCH (25.4 mm) GROUND CLEARANCE ON MAXIMUM GROWN TIRE

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Landing Gear Axle Jack Points Figure 202/07-11-03-990-802 (Sheet 3 of 3)

ARO ALL





1 LOADS BASED ON CRITICAL CG

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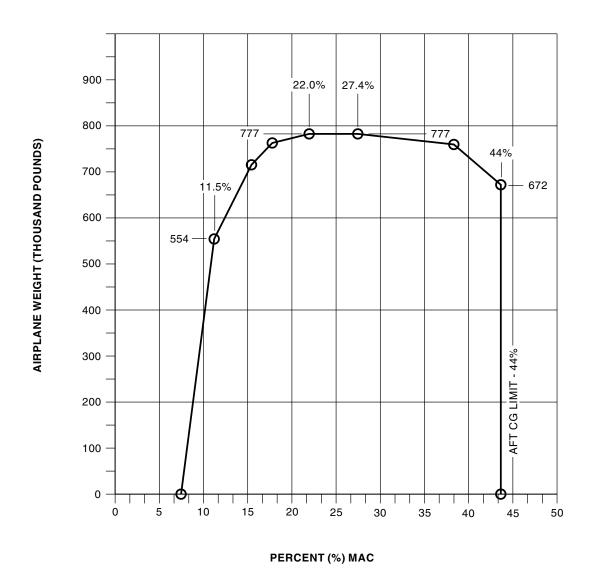
Jack Capability vs Airplane Weight Figure 203/07-11-03-990-803

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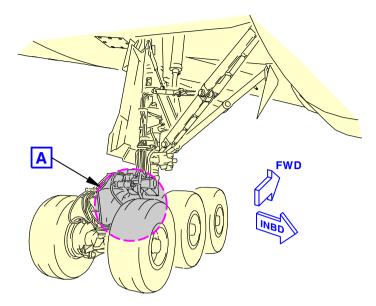
Axle Jacking System Specifications Figure 204/07-11-03-990-804

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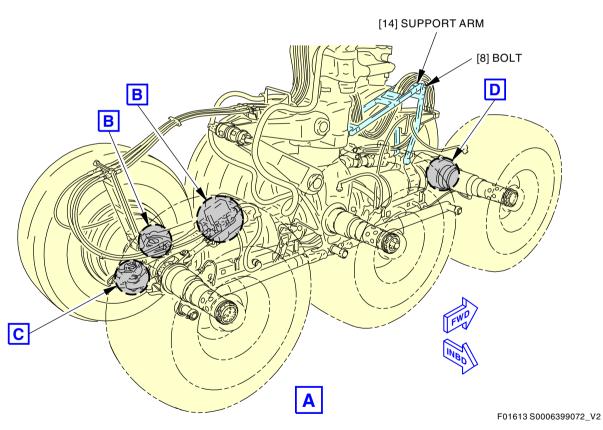
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# LEFT MAIN LANDING GEAR (RIGHT MAIN LANDING GEAR IS EQUIVALENT)



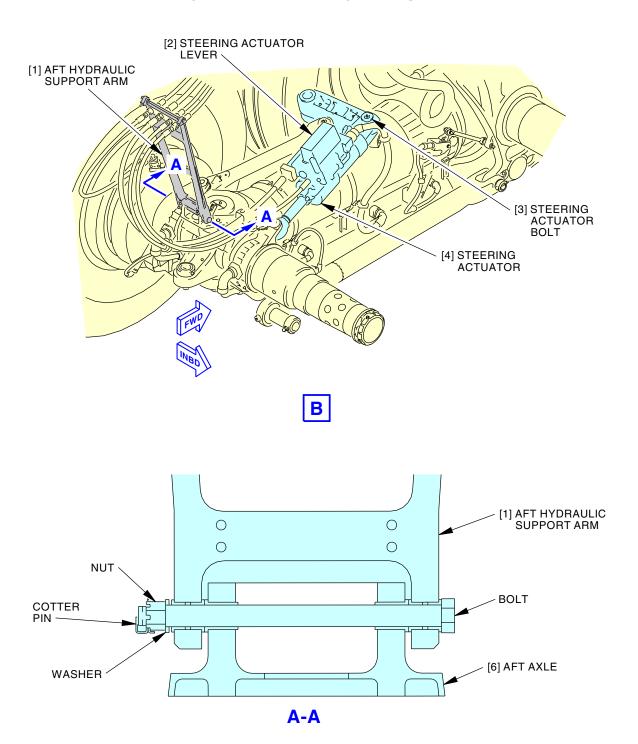
Main Landing Gear Emergency Jack Beam Assembly Installation Figure 205/07-11-03-990-806 (Sheet 1 of 4)

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# Main Landing Gear Emergency Jack Beam Assembly Installation Figure 205/07-11-03-990-806 (Sheet 2 of 4)

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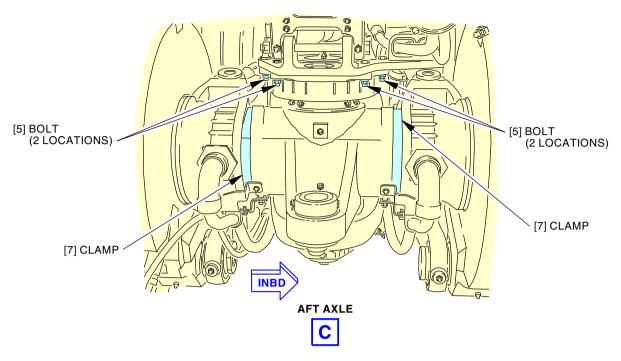
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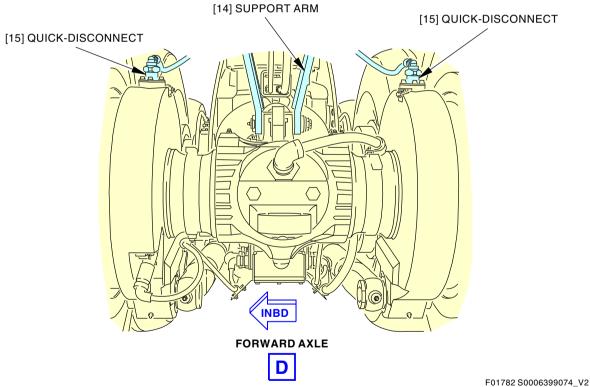
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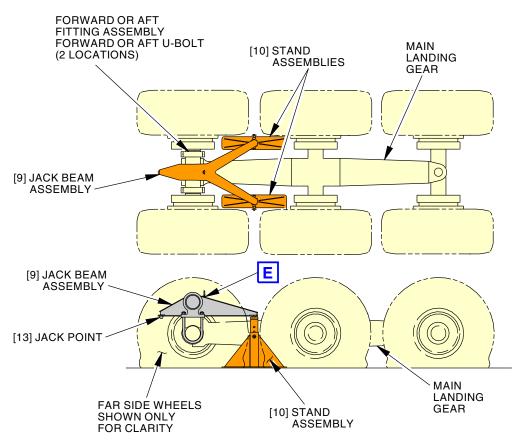
Main Landing Gear Emergency Jack Beam Assembly Installation Figure 205/07-11-03-990-806 (Sheet 3 of 4)

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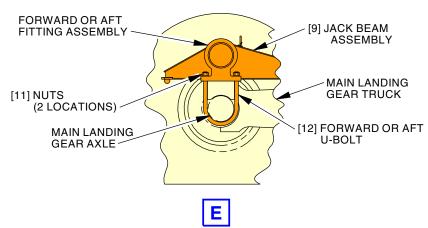
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## FORWARD OR AFT POSITION



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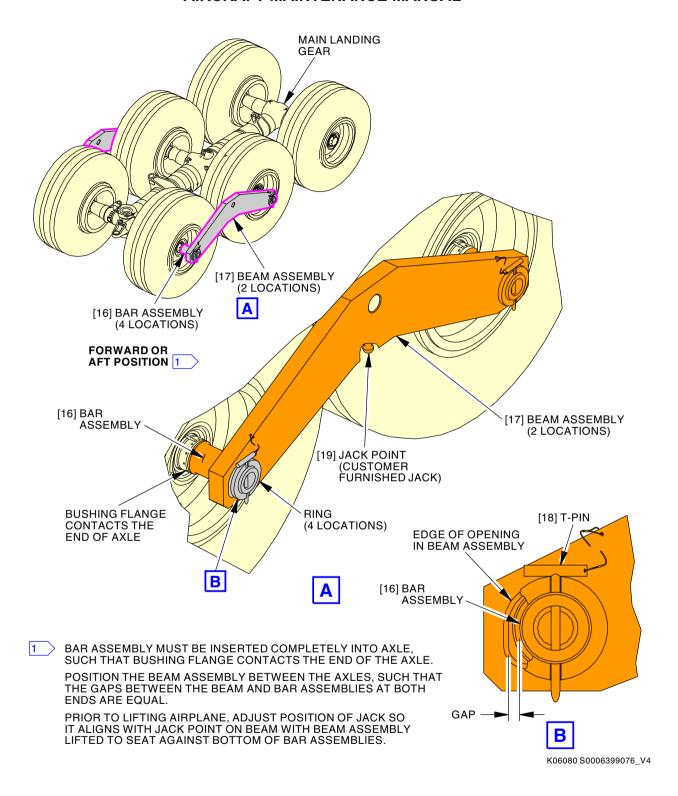
Main Landing Gear Emergency Jack Beam Assembly Installation Figure 205/07-11-03-990-806 (Sheet 4 of 4)

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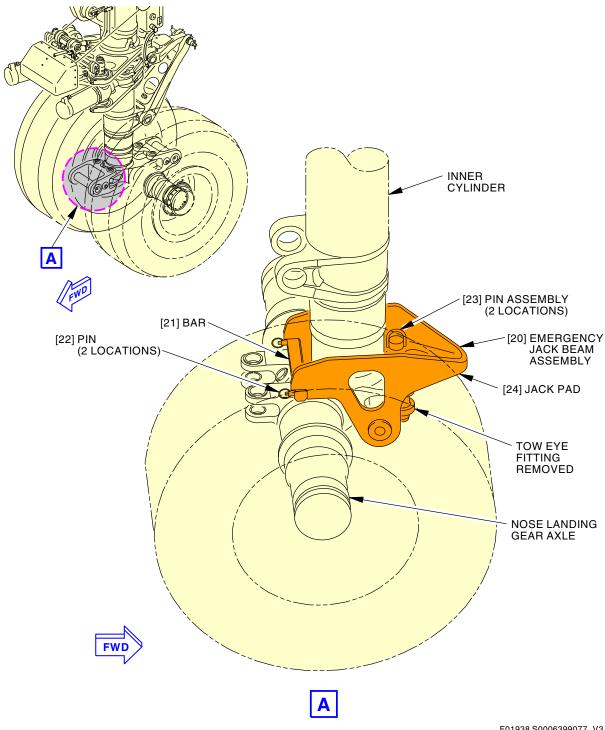
Main Landing Gear Emergency Jack Beam Assembly, J07013 Installation Figure 206/07-11-03-990-805

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# Nose Landing Gear Emergency Jack Beam Assembly Installation Figure 207/07-11-03-990-808

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### JACKING FOR AIRPLANE SUPPORT WITH ENGINE(S) REMOVED - MAINTENANCE PRACTICES

#### 1. General

- A. Jacks are not necessary to keep the airplane stable during an engine removal.
  - (1) This is possible if the airplane gross weight and center of gravity (CG) are in the SAFE ZONE limits.

NOTE: The SAFE ZONE limits are specified in Figure 201 and Figure 202.

## TASK 07-11-05-580-801

## 2. Make the Airplane Stable to Prevent Tipping

## A. References

Reference	Title	
07-11-01-580-804	Lift the Airplane with Jacks (P/B 201)	

#### B. Location Zones

Zone	Area
100	Lower Half of Fuselage
200	Upper Half of Fuselage

### C. Procedure

SUBTASK 07-11-05-970-001

- (1) Find the airplane gross weight.
  - (a) Use the approved weight reports and procedures.

SUBTASK 07-11-05-970-002

- Find the airplane Center of Gravity (CG) for the applicable airplane configuration.
  - (a) Use component weight and CG data and calculation procedures in the approved weight and balance manuals.
  - (b) Make sure you know the location of all components and equipment.

NOTE: This includes support equipment and test equipment that you removed, installed, or put in a different position.

#### SUBTASK 07-11-05-580-001



THE GROUND STABILITY MARGINS DO NOT PERMIT THE REMOVAL OF OTHER COMPONENTS. THEY ALSO DO NOT PERMIT THE MOVEMENT OF PERSONS IN OR NEAR THE AFT END OF THE FUSELAGE. YOU MUST FOLLOW ALL NECESSARY PRECAUTIONS.

(3) If the operation point is in the CAUTION ZONE, and above the GROUND STABILITY MARGIN line, make the airplane stable, do this task: Lift the Airplane with Jacks, TASK 07-11-01-580-804.

NOTE: The airplane will stay stable after an engine removal if the point of operation is in the SAFE ZONE.

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**EFFECTIVITY** 



- (4) Make sure that the point of operation must be in the SAFE ZONE below the GROUND STABILITY MARGIN line.
  - NOTE: In the hangar the airplane will be sufficiently stable to permit some movement of persons in the airplane. It will also permit the controlled removal of components. This is also correct if the airplane is in a no-wind condition. The lower the operation point is below the GROUND STABILITY MARGIN line, the more stable the airplane becomes after engine removal.
  - (a) Use the weight and CG data to find the weight and CG point in (Figure 201, Figure 202).
  - (b) Use accepted weight and CG procedures to move the point of operation into the SAFE ZONE (Figure 201, Figure 202).
    - NOTE: On a two engine removal, the best possible solution might be, to remove and install one engine at a time. Do this to get a point of operation satisfactory for maintenance.
    - <u>NOTE</u>: As an alternative, you can install an airplane jack at the tail jack point to prevent airplane tipping.

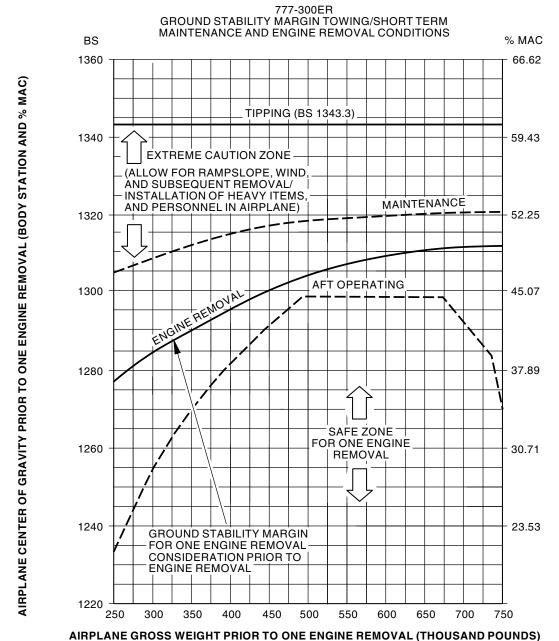


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#### **TIPPING OF 777 AIRPLANE**

THE CHART BELOW SHOWS THE 777-300ER TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1343.3. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. BY ENSURING THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED



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Center of Gravity and Gross Weight Limits for Removal of One Engine Figure 201/07-11-05-990-801 (Sheet 1 of 2)

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#### FIGURE DESCRIPTIONS:

- TIPPING LIMIT THE ABSOLUTE TIPPING LIMIT OF THE AIRPLANE. IF THE AIRPLANE CG GOES AFT OF THIS LIMIT THE AIRPLANE WILL TIP ON IT'S TAIL.
- MAINTENANCE LIMIT THE GROUND LIMIT WHICH PROVIDES AN OPERATING BUFFER FOR THE TIPPING LIMIT. INCLUDED IN THE BUFFER ARE:
  - WINDS UP TO 35 KNOTS
  - TOWING FORCES
  - 3% RAMP SLOPE
- AFT OPERATING LIMIT THE AFT LIMIT OF THE GROSS WEIGHT VERSUS CG ENVELOPE.

  IT IS THE MOST AFT CG THAT THE AIRPLANE CAN OPERATE

  AT DURING NORMAL REVENUE SERVICE.
- 1 ENGINE REMOVAL LIMIT THE AIRPLANE CG SHOULD BE FORWARD OF THIS LIMIT <u>PRIOR</u>
  TO REMOVING ONE OF THE ENGINES. BEING FORWARD WILL
  ENSURE THAT THE AIRPLANE CG WILL NOT BE AFT OF THE
  MAINTENANCE LIMIT WHEN AN ENGINE IS REMOVED.
- 2 ENGINE REMOVAL LIMIT THE AIRPLANE CG SHOULD BE FORWARD OF THIS LIMIT <u>PRIOR</u>
  TO REMOVING BOTH OF THE ENGINES. BEING FORWARD WILL
  ENSURE THAT THE AIRPLANE CG WILL NOT BE AFT OF THE
  MAINTENANCE LIMIT WHEN THE ENGINES ARE REMOVED.

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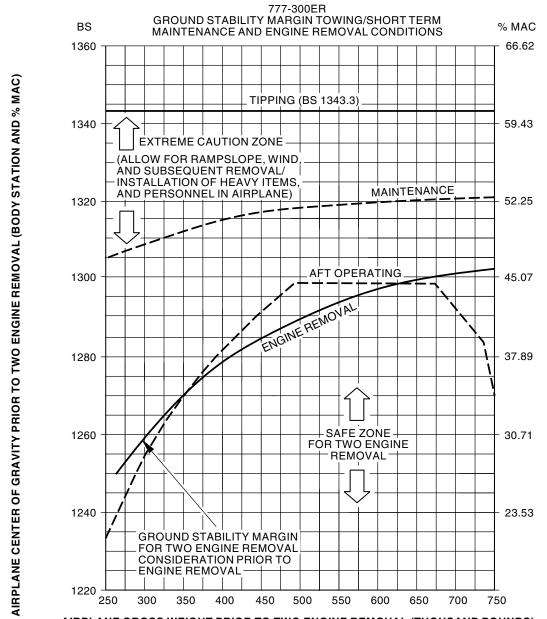
Center of Gravity and Gross Weight Limits for Removal of One Engine Figure 201/07-11-05-990-801 (Sheet 2 of 2)

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#### **TIPPING OF 777 AIRPLANE**

THE CHART BELOW SHOWS THE 777-300ER TIPPING LIMITS. THE ABSOLUTE TIPPING LIMIT IS THE MLG CENTERLINE AT B.S. 1343.3. THE GROUND STABILITY MARGIN LINE REPRESENTS THE ABSOLUTE TIPPING LIMIT TO ACCOUNT FOR FACTORS SUCH AS TOWING FORCES, RAMP SLOPE AND WIND. BY ENSURING THAT THE AIRPLANE WEIGHT AND C.G. DURING MAINTENANCE OPERATIONS IS BELOW THIS LINE, A TIPPING SITUATION WILL BE AVOIDED



AIRPLANE GROSS WEIGHT PRIOR TO TWO ENGINE REMOVAL (THOUSAND POUNDS)

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Center of Gravity and Gross Weight Limits for Removal of Two Engines Figure 202/07-11-05-990-802 (Sheet 1 of 2)

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#### FIGURE DESCRIPTIONS:

- TIPPING LIMIT THE ABSOLUTE TIPPING LIMIT OF THE AIRPLANE. IF THE AIRPLANE CG GOES AFT OF THIS LIMIT THE AIRPLANE WILL TIP ON IT'S TAIL.
- MAINTENANCE LIMIT THE GROUND LIMIT WHICH PROVIDES AN OPERATING BUFFER FOR THE TIPPING LIMIT. INCLUDED IN THE BUFFER ARE:
  - WINDS UP TO 35 KNOTS
  - TOWING FORCES
  - 3% RAMP SLOPE
- AFT OPERATING LIMIT THE AFT LIMIT OF THE GROSS WEIGHT VERSUS CG ENVELOPE.

  IT IS THE MOST AFT CG THAT THE AIRPLANE CAN OPERATE

  AT DURING NORMAL REVENUE SERVICE.
- 1 ENGINE REMOVAL LIMIT THE AIRPLANE CG SHOULD BE FORWARD OF THIS LIMIT <u>PRIOR</u>
  TO REMOVING ONE OF THE ENGINES. BEING FORWARD WILL
  ENSURE THAT THE AIRPLANE CG WILL NOT BE AFT OF THE
  MAINTENANCE LIMIT WHEN AN ENGINE IS REMOVED.
- 2 ENGINE REMOVAL LIMIT THE AIRPLANE CG SHOULD BE FORWARD OF THIS LIMIT <u>PRIOR</u>
  TO REMOVING BOTH OF THE ENGINES. BEING FORWARD WILL
  ENSURE THAT THE AIRPLANE CG WILL NOT BE AFT OF THE
  MAINTENANCE LIMIT WHEN THE ENGINES ARE REMOVED.

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Center of Gravity and Gross Weight Limits for Removal of Two Engines Figure 202/07-11-05-990-802 (Sheet 2 of 2)

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