

III. CACHE TRANSPORTATION — AIR

A. AIRCRAFT ORIENTATION — MILITARY AND CIVILIAN

Upon activation of your task force, expeditious movement of personnel and equipment to the disaster site is essential for lifesaving. Since air travel is usually the fastest means of travel, you need to be familiar with the various types of military and civilian aircraft, with their cargo and personnel-carrying capabilities, that may be used to carry the task force cache and personnel

Airfield Safety

- Safety is the most important consideration in any airlift movement. Injury to personnel or damage to equipment or aircraft will impact the overall mission effectiveness. Always remember the basic doctrine of safety:
 - Expose only the minimum number of personnel to the minimum number of hazards for the minimum amount of time.

Flight Line Safety

- The aircraft flight line is a potentially dangerous area of operation. This is particularly true when personnel are not familiar with routine activities and the rules that govern these activities -- personnel like task force members! Listed here are a few of the rules and hazards to be aware of on all flight lines:
 - **Right of way** — Aircraft always have the right of way over motor vehicles. Always yield or move out of the way.
 - **Smoking** — Smoking is not permitted on the flight line.
 - **Noise Hazards** — Always wear ear protection. Aircraft engines and power units can ruin your hearing very rapidly.
 - **Exhaust Hazards** — Engines and power units create a tremendous amount of heat in the normal course of their operations. Be extremely careful when around them.

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Flight Line Safety	
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Airfield Safety (continued)

- **Propellers and Engine Ingestion Hazards** — Propellers pose an obvious hazard and can pick up and ingest nearby objects. Restrict your activities anywhere near the front of an operating engine.
- **Escorts** — Because of the large number of hazards, user personnel must be escorted by Air Force personnel or representatives from the A/DACG or MCC.
- **Speed Limits** — Speeding on the flight line will not be tolerated. Observe these maximum speed limits:
 - Aircraft parking ramp - 15 MPH
 - within 25 feet of the aircraft - 5 MPH
 - inside the aircraft - extremely slow and cautious
- **Warning** — Never sit or lie down on the aircraft parking ramp.
- **Lights** — Avoid directing headlights at a taxiing aircraft at night.

Circle of Safety

- Vehicles are not allowed within the Circle of Safety (see illustration) unless they are to be loaded aboard or used to service the aircraft. All vehicles must approach the aircraft so the driver's side is toward the aircraft. Never drive a vehicle under any part of the aircraft or between the wing tips of parked aircraft.

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Airfield Safety	
• Propellers and Engine Ingestion Hazards Restrict your activities anywhere near the front of an operating engine. • Escorts — Personnel must be escorted by Air Force personnel. • Speed Limits — Speeding on the flight line not tolerated. Maximum limits:	
- Aircraft parking ramp - 15 MPH - within 25 feet of the aircraft - 5 MPH - inside the aircraft - slow and cautious	
• Warning — Never sit or lie down on the aircraft parking ramp. • Lights — Avoid directing headlights at a taxiing aircraft at night.	
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Circle of Safety (continued)

- Vehicle Parking Rules — Follow these rules when parking a vehicle on the parking ramp:
 - Park perpendicular to the fuselage.
 - If the vehicle is left unattended;
 - Turn off ignition.
 - Leave key in ignition.
 - Put vehicle in lowest gear (standard shift, gasoline-powered) or neutral (diesel-powered) or in Park (automatic transmission).
 - Set the parking brake.
 - Between the hours of dusk and dawn, turn on the parking lights or operate emergency flashers.

Transport of Task Force Search Canines

- Normally, any animal transported by a USAF cargo aircraft must be transported in an approved kennel. However, the Armed Forces have approved a special waiver so that US&R Task Force search canines may travel uncaged but properly restrained.
 - Have the transport waiver available for the aircrew.
 - The canine/handler teams should load last and disembark first. This allows the dogs the maximum time to relieve themselves.
 - If possible, load the canine teams aft, just forward of the pallets. This is usually the largest open area on the aircraft after loading.
 - Secure the dogs with a quick-release harness to a tie-down ring during takeoff and landing.

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Circle of Safety	
■ Vehicles are not allowed within the Circle of Safety unless they are to be loaded aboard or to service the aircraft.	
■ Follow these rules when parking a vehicle on the parking ramp:	
• Park perpendicular to fuselage.	
• If the vehicle is left unattended:	
- Turn off ignition.	
- Leave key in ignition.	
- Put vehicle in Park	
- Set the parking brake.	
- Dusk to dawn, turn on the parking lights.	
AIRCRAFT ORIENTATION VIEW GRAPH III A - 3	
Transport of Task Force Search Canines	
■ Any animal transported by a USAF cargo aircraft must be transported in an approved kennel.	
• Have the transport waiver available for the aircrew.	
• The canine/handler teams should load last and disembark first.	
• If possible, load the canine teams aft, just forward of the pallets.	
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THE MILITARY AIR CARGO FLEET

C-130 E/H "Hercules"

- Description — The C-130 E/H is a four engine turbo-jet propeller cargo aircraft capable of carrying an allowable cabin load (ACL) of 25,000 pounds over long distances (peace time).
- There is a direct trade-off between the weight of cargo and aircraft fuel requirements. Remember: The more your cargo weighs, the shorter the distance that the aircraft can fly.
- Dimensional Data — Cargo compartment height - 108"
 - Compartment width: (pallet positions 1,2,5&6) - 123"
(pallet positions 3&4) - 116"
- 463L pallet capacity - 6
 - 5 on main cargo floor (positions 1-5)
 - 1 on cargo ramp (position 6)
- 463L Pallet Limitations :
 - Pallet position 1-2
 - Load height measured from top of pallet - 96"
 - Max weight (incl. pallet and nets) - 10,354 lbs.
 - Pallet positions 3-4
 - Load height measured from top of pallet - 96"
 - Max weight (incl. pallet and nets) - 10,354 lbs.
 - A 6" aisle way is required on one of the short sides of pallet (88"long) that are planned to go into pallet positions 3-4. This will allow free access to rear of aircraft by crew.
 - Pallet position 6 (ramp pallet)
 - Load height measured from top of pallet - 76"
 - Max weight of pallet and nets - 4664 pounds
 - When building pallet position 6 (ramp pallet), allow an 18" aisle on either short side of pallet.
- Passenger Limitations —
 - Maximum passengers over land routes - 200 (only ramp position available for palletized cargo)
 - Maximum passengers over water routes - 153 (only ramp position available for palletized cargo, additional space allows access to exits if ditching is required)
 - limited to life raft capacities of the aircraft

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AIRCRAFT ORIENTATION	
C-130 E/H "Hercules"	
■ Description — The C-130 E/H is a four engine turbo-jet propeller cargo aircraft.	
■ Direct trade-off between the weight of cargo and aircraft fuel requirements.	
■ Dimensional Data — Cargo compartment height - 108"	
■ 463L pallet capacity - 6	
■ 463L Pallet Limitations	
■ Passenger Limitations	
VIEW GRAPH III A - 5	

- planning: allow for 2 seat for aircraft loadmasters

III. CACHE TRANSPORTATION — AIR

A. AIRCRAFT ORIENTATION — MILITARY AND CIVILIAN

C-141B “Starlifter”

- Description — The C-141B “Starlifter” is a four-engine jet fan cargo airlift aircraft. Normal allowable cabin load (ACL) is 46,000 pounds.
 - As with the C-130, distance of flight affects the actual ACL that will be imposed on your task force. The longer distance flown lowers amount of weight that can be airlifted unless aerial re-fueling is used.
- Dimensional Data
 - Cargo compartment height - 109"
 - Cargo compartment width - 123"
 - 463L pallet capacity - 13
 - (12) on main cargo floor (pallet positions 1-12)
 - (1) on cargo ramp (pallet position 13)
- 463L PALLET Limitations
 - Pallet position 1:
 - Load height measured from top of pallet - 76"
 - Max weight (incl. pallet and nets) - 10,354 lbs.
 - Pallet positions 2-12:
 - Load height measured from top of pallet - 96"
 - Max weight (incl. pallet and nets) - 10,354 lbs.
 - Pallet position 13 (ramp pallet)
 - Load height measured from top of pallet - 76"
 - Max weight (incl. pallet and nets) - 7500 lbs.
- Passenger limitations
 - Maximum passengers over land - 200 (only ramp position available for palletized cargo)
 - Maximum passengers over water - 153 (only ramp position available for palletized cargo, additional space allows access to emergency exits if ditching is required)
 - limited to life raft capacities of the aircraft
 - planning: allow 2 seats for aircraft loadmasters
 - C-141B carries 98 sidewall and 110 centerline seats.
- Cargo width versus Passenger seating — configured with sidewalls seats only
 - 80" or less: accommodates personnel on both sides
 - Cargo over 80" to 96": accommodates seats along one side of cargo if cargo is off center-loaded to one side

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AIRCRAFT ORIENTATION	
C-141B "Starlifter"	
■ Description — The C-141B "Starlifter"	is a four-engine jet fan cargo airlift aircraft.
■ Dimensional Data	
■ 463L PALLET Limitations t and nets - 7500 lbs.	
■ Passenger limitations	
■ Cargo width versus Passenger seating	
VIEW GRAPH III A - 6	

- Cargo over 96" width: no seats are available

III. CACHE TRANSPORTATION — AIR
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C-5B “Galaxy”

- The C-5B “Galaxy” is a four-engine jet fan cargo airlift aircraft. Normal allowable cabin load (ACL) is 130,000 pounds.
- As with the C-130 and C-141, distance of flight affects the actual ACL that will be imposed on your task force. The longer distance flown lowers amount of weight that can be airlifted.
- Dimensional Data
 - Cargo compartment height - 162", 114" at sidewalls, tapering to the center fuselage max height of 162"
 - Cargo compartment width - 228"
 - 463L pallet capacity - 36
 - 32 on the main cargo floor (pallet positions 3-34)
 - 4 on cargo ramps (pallet positions 1&2 on front ramp and pallet positions 35 &36 rear ramp)
- 463L PALLET Limitations
 - Pallet position 1&2 (front ramp pallets)
 - Load height measured from top of pallet - 96"
 - Max weight including weight of pallet and nets - 7500 pounds
 - Pallet positions 3-34
 - Load height measured from top of pallet - 96"
 - Max weight (incl. pallet and nets) - 10,354 lbs.
 - Pallet position 35 &36 (rear ramp pallets)
 - Load height measured from top of pallet - 70"
 - Max weight (incl. pallet and nets) - 7500 lbs.
 - 14" aisle is required on short side of both pallets to allow access to pressure door
- Passenger limitations
 - 73 seats are available to your task force in the passenger compartment; all are aft-facing seats
 - A contingency seat kit is available in an emergency situation that will accommodate 267 seats secured on pallets. This kit is loaded in the cargo area of the C-5B.
 - NOTE: There are only 2 of these contingency kits available in the Air Force system; one each at Travis AFB, CA and Dover AFB, DE.

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C-5B “Galaxy”	
■ The C-5B “Galaxy” is a four-engine jet fan cargo airlift aircraft.	
■ As with the C-130 and C-141, distance of flight affects the actual ACL that will be imposed on your task force.	
■ Dimensional Data	
■ 463L PALLET Limitations	
■ Passenger limitations	
VIEW GRAPH III A - 7	

III. CACHE TRANSPORTATION — AIR

A. AIRCRAFT ORIENTATION — MILITARY AND CIVILIAN

C-17A “Globemaster III”

- The C-17A “Globemaster III” is a four-engine jet fan cargo airlift aircraft. Normal allowable cabin load (ACL) is 90,000 pounds. Maximum payload over 2,400 nautical miles (NM) unrefueled is 160,000 pounds; over 2800 NM is 120,000 pounds. It is possible to park eight C-17's in the same area required to park three C-5's or six C-141's.
- As with the C-130, C-141 and the C-5, distance of flight affects the actual ACL that will be imposed on a task force. The longer distance flown lowers the weight airlifted.
- Dimensional Data
 - Cargo compartment height - 148", Unlike the C-5B, the 148" height limitation extends across entire cargo floor.
 - Cargo compartment width - 216"
 - 463L pallet capacity:
 - 18 (logistical resupply/air land)
 - 14 (tactical resupply/airdrop)
 - (14) on the main cargo floor (positions 1-14)
 - (4) on cargo ramp (pallet positions 15-18)
- 463L PALLET Limitations
 - Pallet position 1-14
 - Load height measured from top of pallet - 96"
 - Max weight (incl. pallet and nets) - 10,354 lbs.
 - Pallet positions 15-18
 - Load height measured from top of pallet - 96"
 - Max weight (incl. pallet and nets) - 7,500 lbs.
- Passenger limitations
 - 102 permanently installed fold-up or down plastic seats
 - With 102 seats, 6 cargo pallets can still be transported
- Cargo width versus passengers seats
 - Cargo width of 156" or less, seats on both sides of cargo can be used
 - Cargo width of 157" to 192", seats can be used on one side of aircraft if cargo is off-center loaded
 - Cargo over 192"; no seats are available

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C-17A “Globemaster III”	
■ The C-17A “Globemaster III” is a four-engine jet fan cargo airlift aircraft.	
■ As with the C-130, C-141 and the C-5, distance of flight affects the actual ACL that will be imposed on a task force.	
■ Dimensional Data	
■ 463L PALLET Limitations	
■ Cargo width versus passengers seats	
VIEW GRAPH III A - 8	

III. CACHE TRANSPORTATION — AIR

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THE CIVILIAN AIR CARGO FLEET

Introduction

- Civilian airlines offer a wide range of air cargo services. As a matter of fact, most airlines generate more revenue through their cargo services than through their passenger services. Logistics Specialists must be equally prepared to oversee the transport of task force personnel and equipment using this important means, as there may be times when military aircraft are unavailable for whatever reason.
- One benefit of the use of civilian cargo aircraft is their versatility. While they have scheduled flights, clients can arrange for an ad hoc charter for virtually any time and any destination. The only catch is the shorter the lead time, the more the service is going to cost. Attached is an information letter written in response to a request for information from a Logistics Specialist on FL-TF1. You must make these contacts *before* a deployment, so that you have concrete information regarding cost, 24-hour availability and necessary lead time to arrange a flight.

Cargo Containers

- While you may need to hand-load cache boxes onto a conveyor belt to be stowed in the hold of a commercial aircraft, there may be times that the cache will be packed into standardized Air cargo containers. Refer to the attached listing for weight and volume figures.
- However the cache is stowed on the aircraft, door opening dimensions may require you to reconfigure and/or repack some elements of your cache. Refer to the attached Aircraft Configurations chart.

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THE CIVILIAN AIR CARGO FLEET	
■ Civilian airlines offer a wide range of air cargo services.	
• Log Specialists must be prepared to oversee the transport of personnel and equipment.	
■ One benefit of the use of civilian cargo aircraft is their versatility.	
• While they have scheduled flights, clients can arrange for an ad hoc charter for virtually any time and any destination.	
• The lead time, the more the service is going to cost.	
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VIEW GRAPH III A - 9	
AIRCRAFT ORIENTATION	
Cargo Containers	
■ Hand-loaded cache boxes can be placed onto a conveyor belt to be stowed in the hold of a commercial aircraft.	
• There may be times that the cache will be packed into standardized Air cargo containers.	
■ However the cache is stowed on the aircraft, door opening dimensions may require you to reconfigure and/or repack some elements of your cache.	

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LOAD PLANNING FOR CIVILIAN CARGO AIRCRAFT

Boeing 747/100/200B/SP/Combi

- The Boeing 747 is a wide-body aircraft flown by airlines in passenger, cargo and combi (both passenger and cargo) configurations. The B747 is normally contracted to carry 364 passengers to 461 passengers, or 180,000 pounds of cargo. The actual passenger/cargo maximum may be higher, based on series and individual aircraft configuration.
 - For wartime planning, use 401 seats for passenger/troops and 90 tons of cargo for a Civilian Air Reserve Fleet (CARF) mission.
- The B747-100B/200B and B747SP are all passenger aircraft.
- The B747-100F/200F are cargo aircraft with 33 or 37 pallet positions on the main deck. The 100F has a side cargo door, while the 200F has a nose cargo door, with an optional side cargo door. The B747F is also referred to as the B747-100SF.
- The B747-100 MOD C/-200 MOD C means the aircraft is modified to carry cargo under the CARF Enhancement Program. This is a convertible model configured for all passengers or all cargo. For CARF planning, it will be configured for cargo, with 30 or 34 pallet positions on the main deck. The cargo door is on the side.
- The B747-200C is a convertible model that is configured in the all-cargo mode for CARF planning purposes. It has 30 pallets to 34 pallets on the main deck. Other options are all-passenger or passenger/cargo combinations. A typical arrangement is to have 351 seats and six pallets, 239 seats and 14 pallets, or 155 seats and 22 pallets.
- The B747 Combi has a side door with the same passenger/cargo combinations as the B747-200C. This model cannot, however, be configured in the all-cargo mode. None of these aircraft are used by US carriers.
- The maximum payload for this aircraft is computed without regard to cargo density, and is limited only by aircraft structural limitations or fuel requirements for a specific range.

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Boeing 747/100/200B/SP/Combi	
■ The B747-100B/200B and B747SP are all passenger aircraft.	
■ The B747-100F/200F are cargo aircraft with 33 or 37 pallet positions.	
■ The B747-100 MOD C/-200 MOD C is modified to carry cargo under the CARF Enhancement Program.	
■ The B747-200C is a convertible model that is configured in the all-cargo mode.	
■ The B747 Combi has a side door with the same passenger/cargo combinations as the B747-200C.	
VIEW GRAPH III A - 11	

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B707C/F

- The narrow-body B707 can carry up to 90,000 pounds of cargo. The B707 convertible© and freighter (F) have 13 pallet positions available.
- The aircraft's lower compartment cannot accept loaded pallets due to door size restrictions and the rounded contour of the floor.
- The actual number of passenger seating depends on spacing and carrier requirements. The USAF contracts for this type of aircraft when the user requirement is for 180+ seats. For wartime planning, 142 troops can be transported 3,500 nautical miles when using the specific capabilities of the B707-300 aircraft presently in the CARF.

L-1011/100/221/500

- The Lockheed L-1011 is a wide-body, long-range, tri-jet passenger aircraft. It is normally configured for 246 passengers to 330 passengers. Variations on passenger seating depend upon the aircraft series, location of galley, spacing requirements of the seats and contract requirements.
- The military uses a figure of 175 passengers per aircraft for the L-1011 100 Model and 221 passengers for the L-1011 500 Model, based on 315 pounds per individual over a 3,500 nautical mile leg.

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B707C/F	
■ The narrow-body B707 can carry up to 90,000 pounds of cargo. .	
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■ The actual number of passenger seating depends on spacing and carrier requirements. The USAF contracts for this type of aircraft when the user requirement is for 180+ seats.	
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AIRCRAFT ORIENTATION	
L-1011/100/221/500	
■ The Lockheed L-1011 is a wide-body, long-range, tri-jet passenger aircraft.	
• It is normally configured for 246 passengers to 330 passengers.	
■ The military uses a figure of 175 passengers per aircraft for the L-1011 100 Model and 221 passengers for the L-1011 500 Model, <u>based on 315 pounds per individual</u> over a 3,500 nautical mile leg.	

III. CACHE TRANSPORTATION — AIR

A. AIRCRAFT ORIENTATION — MILITARY AND CIVILIAN

DC-8/61F/62F/71F/73F

- The narrow-body DC-8 can carry up to 88,000 pounds of cargo or from 165 passengers to 252 passengers.
- In general, the DC-8/62F/CF has 14 pallet positions, while the DC-8/61CF/63F/CF and 71CF/73F/CF have 18 pallet positions.
- The lower lobes cannot accept pallets because of door size and the rounded contour of the floor.
- The actual number of passenger seats on the DC-8 varies by model and spacing requirements. The USAF normally contracts for 235 passengers when contracting for this aircraft.

B767

- The Boeing 767 is a twin-engine, wide-body aircraft capable of long-range international operations.
- Seat capacity ranges from 193 passengers to 269 passengers.
- This is the only commercial aircraft eligible for aeromedical evacuation requirements. They are fitted with aeromedical ship sets, which are specifically designed for this aircraft.
- The B-767 is used for cargo transport, having two compartments. The front compartment will hold up to six LD3 or LD4 containers. Aft will hold five LD3 or LD4 containers.

DC-10

- The McDonnell Douglas DC-10 is a wide-body, tri-jet aircraft flown in both passengers and cargo configurations.
- The DC-10 can carry up to 380 passengers or 176,000 lbs.
- The DC-10/30/40 are passenger aircraft, while the DC-10-10CF/-30CF are convertible aircraft which can be configured for either all-passenger or all-cargo operations. The DC-10-30F has been permanently converted to the freighter version, which

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DC-8/61F/62F/71F/73F	
■ The narrow-body DC-8 can carry up to 88,000 pounds of cargo or from 165 passengers to 252 passengers.	
VIEW GRAPH III A - 14	
CACHE TRANSPORT	
■ The DC-8/62F/CF has 14 pallet positions, while the DC-8/61CF/63F/CF and 71CF/73F/CF have 18 pallet positions.	
VIEW GRAPH III A - 15	
CACHE TRANSPORT	
■ The lower lobes cannot accept pallets due to door size and rounded contour.	
AIRCRAFT ORIENTATION	
■ The actual number of passenger seats on the DC-8 varies by model and spacing requirements. The USAF normally contracts for 235 passengers when contracting for this aircraft.	
VIEW GRAPH III A - 16	
CACHE TRANSPORT	
■ The Boeing 767 is a twin-engine, wide-body aircraft capable of long-range international operations.	
VIEW GRAPH III A - 17	
CACHE TRANSPORT	
■ Seat capacity ranges from 193 passengers to 269 passengers.	
AIRCRAFT ORIENTATION	
■ This is the only commercial aircraft eligible for aeromedical evacuation requirements.	
VIEW GRAPH III A - 18	
CACHE TRANSPORT	
■ The McDonnell Douglas DC-10 is a wide-body, tri-jet aircraft flown in both passengers and cargo configurations.	
VIEW GRAPH III A - 19	
CACHE TRANSPORT	
■ The B-767 is used for cargo transport, having two compartments. The front will hold six LD3/LD4 containers. Aft will hold five LD3 or LD4 containers.	
VIEW GRAPH III A - 20	
CACHE TRANSPORT	
■ The DC-10 can carry up to 380 passengers or 176,000 lbs.	
VIEW GRAPH III A - 21	
CACHE TRANSPORT	
■ The DC-10/30/40 are passenger aircraft, while the DC-10-10CF/-30CF are convertible aircraft which can be configured for either all-passenger or all-cargo operations.	

has an increased payload and greater interior dimensions on the main deck. For CARF planning, the CF models will be used to carry cargo.

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Heliports and Helispots

- Definitions: Sometimes called a "Landing Zone" or "LZ," heliports and helispots are the sites on which helicopter operations are conducted. A heliport is a site: that you can drive to, where there may be many helicopter operations, that may be adjacent to an ICP or BoO, that may have aviation services such as fueling, that may serve as a base for all incident helicopter operations. A helispot is a temporary site that: may be used once or just a few times, you may not be able to drive to, generally is remote and may be at the actual incident site.
- Site selection: There are three components to consider when selecting a helicopter operational site that have to compliment one another. They are:
 - Approach and departure paths or lanes. These paths should be oriented to the prevailing wind to the extent possible. They must be free of obstructions such as wires, antennas, buildings, etc that may intrude into the airspace. The approach and departure path can be viewed as a funnel, a large opening at each end, with the narrow middle at the landing site. A good rule of thumb is to think of the approach and departure path, as you would at an airport, as the space where descent to landing and ascent on departure is accomplished.
 - Safety circle. This circle is calculated to be 1 1/2 to 2 times the rotor diameter of the largest helicopter in use. A good rule of thumb is to use about 100 feet. The safety circle provides an area clear of obstacles that the helicopter can maneuver in while making adjustments to the final landing approach or departure path. Note that all activities at the heliport or helispot take place outside of the safety circle until actual loading or unloading takes place.
 - Touch down pad. This is the surface that the helicopter actually lands on. The touch down pad may be as small as 15' x 15' for small helicopters, to 50' x 50' for large helicopters. The pad needs to be level, or at least have a slope of less than 10% in any direction. A good rule of thumb is to estimate the dimensions of the touch down pad as one rotor diameter, or about 50'.

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HELICOPTER ORIENTATION	
Heliports and Helispots	
■ Definitions: Sometimes called a "Landing Zone" or "LZ," heliports and helispots are the sites on which helicopter operations are conducted.	
• A heliport is a site that you can drive to, where there may be many helicopter operations, that may have aviation services.	
• A helispot is a temporary site that may be used once or just a few times.	
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VIEW GRAPH III B - 1	
HELICOPTER ORIENTATION	
■ Site selection: There are three components to consider:	
• Approach and departure paths or lanes.	
• Safety circle. This circle is calculated to be 1 1/2 to 2 times the rotor diameter of the largest helicopter in use.	
• Touch down pad. This is the surface that the helicopter actually lands on.	

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B. HELICOPTER ORIENTATION

Heliports and Helispots (continued)

- To put this all together, one way to visualize an effective heliport or helispot is to consider that on an area the size of a football field you could easily operate three UH-60 Blackhawks - as we did at the Cobb County Fairgrounds in Marietta, GA. However, the football field analogy may present some real problems. What are they?
- Passengers and cargo awaiting transportation must be well outside of the safety circles around each touch down pad.

Passenger/Cargo Manifests

- Definitions:
 - The Passenger/Cargo Manifests are simply lists of the names of personnel on each flight and the cargo that accompanies them or goes on separate flights. In either case, manifests are a useful management tool.
 - They may be forms of Department of Defense, Department of Agriculture, Federal Aviation Administration, or even your own agency origin.
 - No matter what the source, they all have the same basic information.
- Use of the forms: We generally think of the forms as a source of information as to who and/or what was on a particular aircraft should it be involved in an accident or incident. That's true. However, developing the information for the forms is a useful management exercise that yields several benefits to the US&R Task Force that is being airlifted. Note: this information is true for either fixed wing or rotary winged aircraft. Some examples of management inputs into the completion of the forms might be:
 - As the 62 person Task Force is "manifested" at the Point of Departure, include each persons name, weight fully clothed and with their day pack ("equipped weight"), social security number and other information your agency requires. Then copy this manifest many times! It can then be distributed during your operational period to whomever needs a copy.

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■ Definitions:	
• The Passenger/Cargo Manifests are simply lists of the names of personnel on each flight and the cargo that accompanies them or goes on separate flights.	
• They may be forms of DoD, Department of Agriculture, Federal Aviation Administration, or even your own agency origin. • No matter what the source, they all have the same basic information.	
VIEW GRAPH III B - 3	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Passenger/Cargo Manifests (continued)

- For helicopter operations, merely line out those Task Force members who are not going on a particular flight. Every thing that is needed, in terms of personnel, remains on this copy of the original manifest and you don't need to make a new one for each flight. Note: In the field, put a stack of completed manifests on a clipboard. Put regular pencil carbon paper between the first and second sheets. Then, as you prepare the manifest for a particular flight, you have an "original" to hand to the Heliport Manager or IST Transportation Unit Leader and a copy for your files - without a copy machine!

- Another simple process that will aid management of the Task Force is to "design" each load of passengers and their personal gear so that:

- All personnel of a particular discipline are not on the same flight, i.e., the entire Medical Team or entire Search Team, or both Structures Specialists, or both Communications Specialists. By mixing each load, should an aircraft have an inflight emergency and be diverted, the Task Force could still arrive at the incident with a minimum compliment of personnel.
- To the extent possible, "average" the weights of each planned load. This way you don't have all the big (heavy) folks on one aircraft and the little (light) ones on another.
- If it's going to take "x" number of sorties to move your Task Force, based on the seating capacity of the particular helicopter(s) in use, balance out the loads so that approximately the same number of Task Force members are on each flight. In this manner, you can distribute the mass weight over the entire fleet, rather than have the first few flights go out heavy and the last ones light. And, you can distribute needed equipment more evenly.

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 CACHE TRANSPORT HELICOPTER ORIENTATION	
■ "Design" each load of passengers and their personal gear so that:	
• All personnel of a particular discipline are not on the same flight. • To the extent possible, "average" the weights of each planned load. • If it's going to take "x" number of sorties to move your Task Force, balance out the loads so that approximately the same number of Task Force members are on each flight.	
 VIEW GRAPH III B - 4	

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Passenger/Cargo Manifests (continued)

- Count how many persons, of your 62 person Task Force, are actually going to move via the helicopter operations. An excellent Lesson Learned during an exercise at the Cobb County Fairgrounds was that we were not moving 62 folks, we were actually moving only 51 when we had subtracted out those that had already gone on Recon' or Advanced Party flights and those that were going with assigned vehicles and trucks. This count will help you determine how many sorties you will need for a particular phase of the operation, and distribute loads evenly so that you won't have too much or too little for the last flight. The caboose should not be empty, or over filled!

Aircraft Safety Briefings

- Definitions: A general briefing usually covers information regarding the make and model of the aircraft, its designed purpose, unique features, its load carrying capability and performance characteristics.
 - A specific briefing covers working around the aircraft, loading and unloading of cargo and passengers, seating for the particular mission, location of search dogs and other items that will enhance the safety and comfort of the passengers.
 - An operational briefing is one given to the pilot regarding the mission, passenger and cargo loads to be moved, destination and expectations regarding continued or future use of the aircraft.
- The general briefing is conducted by the pilot or a crew member and is intended to familiarize the passengers with the specific aircraft. It may be done in a training environment with time for discussion. Or, it may be given in an abbreviated form just prior to loading and departure to an incident. The general briefing is also provided to Crash/Rescue personnel along with specific instructions as to where to cut for emergency entrance, or where to direct fire suppressants.

FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98 CACHE TRANSPORT HELICOPTER ORIENTATION Passenger/Cargo Manifests	
Count how many persons, of your 62 person Task Force, are actually going to move via the helicopter operations.	
A Lesson Learned at the Cobb County Fairgrounds was that we were not moving 62 folks, we were actually moving only 51 when we had subtracted out those that had already gone on Recon' Party flights and those going with assigned vehicles and trucks.	
FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98 CACHE TRANSPORT HELICOPTER ORIENTATION VIEW GRAPH III B - 5 Aircraft Safety Briefings	
Definitions: Covers information regarding the aircraft, its designed purpose, unique features, its load carrying capability and performance characteristics.	
- A specific briefing covers working around the aircraft, loading and unloading of cargo and passengers, seating for the particular mission, location of search dogs and other items. - An operational briefing is one given to the pilot regarding the mission, passenger and cargo loads to be moved, destination.	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Aircraft Safety Briefings (continued)

- The specific briefing may also be given by the pilot or a crew member. It is intended to inform the passengers of precise procedures to follow when: loading and unloading passengers and cargo, making seat assignments, demonstrating proper wear of the seat belt and shoulder harness, describing the placement of carry-on and hand held cargo, describing the position that search dogs and handlers will occupy, and this briefing will provide direction on emergency procedures including exit from the aircraft.
- The operational briefing is provided by the IST Operations Chief, Task Force Leader, or other person with knowledge of where the flight will go to and what anticipated in route and arrival conditions will be. Each group of Task Force members should assure themselves that in fact the pilot does know where he or she is going! Agency or mission specific flight following procedures will also be addressed, including radio procedures and frequencies to be used.
- Elements of an Aircraft Safety Briefing (given to passengers by the pilot or an aircrew member) include:
 - Personal Protective Equipment (PPE) will be worn. This includes: a flight helmet or hard hat with chin strap, Nomex outer clothing, ear and eye protection, gloves and boots. Note: this is the same "go to work" clothing that US&R Task Force personnel wear on-site.
 - When approaching or departing the helicopter, always follow these procedures: approach or depart the helicopter on the down hill side of the touch down pad, always approach or depart in a crouch (make this a habit, even when the blades are not turning!), keep in the pilot's or crew chief's field of vision at all times - wait for their signal to approach or depart the aircraft, stay clear of the safety circle and touch down pad at all times - especially during landing and takeoff operations, NEVER walk around the tail of a helicopter!

FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98 CACHE TRANSPORT HELICOPTER ORIENTATION Aircraft Safety Briefings	
■ The specific briefing may also be given by the pilot or a crew member. It is intended to inform the passengers of precise procedures to follow.	
■ The operational briefing is provided by the IST Operations Chief, Task Force Leader, or other person with knowledge of where the flight will go to	
and what anticipated in route and arrival conditions will be.	
FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98 CACHE TRANSPORT VIEW GRAPH III B - 7 HELICOPTER ORIENTATION	
■ Elements of an Aircraft Safety Briefing include: • Personal Protective Equipment (PPE) will be worn. • When approaching or departing the helicopter, always follow these procedures:	
- approach or depart the helicopter on the down hill side of the touch down pad - always approach or depart in a crouch - wait for their signal to approach or depart the aircraft.	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Aircraft Safety Briefings (continued)

- Secure tools, equipment, personal day packs and other gear while awaiting your turn to load - so that they will not blow into the rotor system of a landing helicopter. Note: search dogs should be kept on a leash, especially if they have not been around helicopters before. The noise and, especially, the high frequency turbine wail often disturbs dogs. Do not carry tools, cargo or other equipment over your shoulder when approaching or departing the helicopter. If needed, make assignments as to who will handle the equipment being carried by each group of passengers - so that nothing will be left behind, either on the ground or in the helicopter!
- Once seated in the aircraft, you should: not move about the cabin unless authorized by the pilot, keep your seat belt fastened at all times, unbuckle only when directed to do so by the pilot or crew chief, upon departing - follow the instructions of the pilot or crew chief. Note: if you are not briefed on the location of the following items, ask for this information: first aid kit, survival kit (if required), fire extinguisher, Emergency Locator Transmitter (ELT), fuel and battery shut off switches, and basic operation of the radios.
- Physical security of equipment is easy to accomplish, but may be deadly if not done! Always: secure loose items so they are manageable, put cargo and equipment in appropriate areas of the cabin or cargo compartment. Never throw anything from an airplane or helicopter, or reach up to grab an object that has become unsecured and blown away!
- Smoking is never allowed in aircraft operational areas, for example within the safety circle or on the touch down pad for helicopter operations! And, it is never allowed aboard aircraft during landing, takeoff or tactical operations!
- Emergency procedures. The following guide pertains to helicopter operations:

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■ Elements of an Aircraft Safety Briefing	
include:	
• Secure tools, equipment, day packs and other gear. • Once seated in the aircraft, you should not move about the cabin unless authorized by the pilot, keep your seat belt fastened at all times. • Physical security of equipment is easy to accomplish, but may be deadly if not done! • Smoking is never allowed in aircraft operational areas, for example within the safety circle or on the touch down pad • Emergency procedures.	
VIEW GRAPH III B - 9	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Helicopter In-Flight Emergency Procedures

- Follow instructions of pilot or aircrew member.
- Fasten seat belt and shoulder harness; secure personal gear.
- Hard hat and chin strap secured, or helmet snug.
- Do not place personal gear or cargo under seats because these seats are designed to absorb vertical impact caused by a hard landing or accident.
- Forward facing passengers, restrained with shoulder harnesses, sit in full upright position with head and back against seat and arms folded across chest.
- Forward facing passengers, not restrained by shoulder harnesses, bend forward at the waist, grasp arms under legs and place head between knees.
- Aft (rearward) facing passengers, sit in full upright position with head and back against seat.
- Side facing passengers, bend forward at waist, grasp arms under legs and place head between knees.
- After impact, assist any injured passenger who cannot leave the aircraft.
- Move clear of the aircraft only after rotor blades have stopped or when instructed by the pilot or an aircrew member.
- Assess situation, follow pilot or aircrew instructions, render first aid. Assist pilot and aircrew members to remove first aid kit, radio, ELT, fire extinguisher, and other helpful tools and equipment aboard.
- **Note:** If training is conducted by the agency or company supplying the helicopter, the following subjects should be covered:
 - Initial safety briefing at the aircraft, including normal ingress and egress and emergency egress.
 - Static (with the engine and main rotor shut down) load training.
 - Hot (with the engine running and main rotor turning) loading with a short flight followed by off loading.
 - Slingload demonstration, including correct loading and rigging of cargo pallets and/or nets.

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Helicopter In-Flight Emergency Procedures	
■ Follow instructions of pilot or aircrew.	
■ Fasten seat belt and shoulder harness; secure personal gear.	
■ Hard hat and chin strap secured, or helmet snug.	
■ Do not place personal gear or cargo under seats.	
■ Forward facing passengers, restrained with shoulder harnesses, sit in full upright position.	
■ Forward facing passengers, not restrained by shoulder harnesses, bend forward at the waist.	
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VIEW GRAPH III B - 10	
HELICOPTER ORIENTATION	
Helicopter In-Flight Emergency Procedures	
■ Aft (rearward) facing passengers, sit in full upright position with head and back against seat.	
■ Side facing passengers, bend forward at waist, grasp arms under legs and place head between knees.	
■ After impact, assist any injured passenger who cannot leave the aircraft.	
■ Move clear of the aircraft only after rotor blades have stopped or when instructed by the pilot or an aircrew member.	
■ Assess situation, follow pilot or aircrew instructions, render first aid.	

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Principles of Working Around a Helicopter

- Check to see what kind of communications are established between the heliport or helispot and helicopters that are assigned.
 - All civilian helicopters and most military helicopters have VHF-AM ("FAA") frequencies available for air/ground communications. For example, at the Cobb County Fairgrounds heliport we were able to communicate with the UH-60's on 133.5 MHz.
 - Air/ground communications via radio will smooth out all operations, for everyone involved. To compliment radio communications, you may need to use hand signals.
 - At the initial briefing with the pilot(s) and crew chief(s) make sure that everyone agrees on the meaning of each hand signal to be used! Also, make sure that the signals are given in big, bold, deliberate motions. A pilot will have no clue if insignificant "hand waving" is attempted.
- Check to see if your Task Force will have to provide "Crash/Rescue" service during operations.
 - If so: see if there is a local Fire Department or on-site fire/rescue organization that can provide this service, and see that they have had a briefing by the pilot as to appropriate emergency procedures.
 - If you have to provide the service, make sure that your Task Force personnel have this information, too. If the service is being provided, it's one less worry for you.
 - In either case, make sure personnel and cargo awaiting flights do not block the pathway to the touch down pads for emergency vehicles.
- Have your US&R Task Force well organized and already split into pre-planned groups, in the sequential order they will board the helicopters. Line them up at each "gate" to be ready when called to board.
- Passenger and cargo manifests are prepared prior to arriving at the heliport or helispot.

FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98 CACHE TRANSPORT HELICOPTER ORIENTATION Principles of Working Around a Helicopter	
■ Check to see what kind of communications are established between the heliport and helicopters:	
• All civilian helicopters and most military helicopters have VHF-AM ("FAA") frequencies available for air/ground communications. • Air/ground communications via radio will smooth out all operations, for everyone involved.	
FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98 At the initial briefing make sure that everyone agrees on the meaning of each hand signal to be used!	
VIEW GRAPH III B - 12 HELICOPTER ORIENTATION Principles of Working Around a Helicopter	
■ Check to see if your Task Force will have to provide "Crash/Rescue" service during operations.	
• If so: see if there is a local Fire Department or on-site fire/rescue organization that can provide this service. • If you have to provide the service, make sure that your Task Force personnel have this information, too. • Make sure personnel and cargo awaiting flights do not block the pathway to the touch down pads for emergency vehicles.	

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Principles of Working Around a Helicopter (continued)

- Only the personnel that are boarding the flight should approach the helicopter and then only at the pilot's or crew chief's direction. All others must remain outside of the safety circle and behind a restraint or "gate."
- During sustained operations you will probably board the helicopter while it's main rotor continues to turn. Always approach the helicopter in a crouched position to avoid colliding with the main rotor!
- Before taking cargo or personal gear to the helicopter make sure that all straps are fastened, closures are zipped or buckled, tool sheaths and guards are in place, and containers are tightly closed. Your ball cap should be folded and stuffed into a pocket!
- Designate a loading crew amongst the passengers boarding so that cargo, passenger and personal gear loading proceed smoothly at the direction of the crew chief. Help each other to achieve a smooth departure and arrival!
- If you are moving cargo and no or few passengers, designate a loading crew amongst the remaining Task Force members to help with the loading process. Do not depend on on-lookers or other personnel awaiting transportation to voluntarily lend a hand!
- In anticipation of the next flight, you may want to move the next cargo load to the touch down pad. Place the cargo in a "holding area" designated by the crew chief. However, if the cargo is small and light be aware of the down wash and subsequent problems associated with small cargo blowing around.
- When working in the area of the touch down pad or safety circle, DO NOT work aft of the passenger compartment.
 - The pilot and crew chief do not expect anyone to be behind them and if they have to make a sudden adjustment in position on the touch down pad they can easily move the tail boom into you.

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Principles of Working Around a Helicopter	
■ Only those boarding the flight should approach the helicopter and then only at the pilot's or crew chief's direction.	
■ Always approach the helicopter in a crouched position to avoid colliding with the main rotor!	
■ Before taking cargo or gear onboard make sure all straps are fastened.	
FEMA US&R RESPONSE SYSTEM	
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■ Designate a loading crew so that cargo, passenger and personal gear loading proceed smoothly at the direction of the crew chief.	
VIEW GRAPH III B 14	
HELICOPTER ORIENTATION	
Principles of Working Around a Helicopter	
■ Place the cargo in a "holding area" designated by the crew chief.	
■ When working in the area of the touch down pad or safety circle, DO NOT work aft of the passenger compartment.	
■ Always pick up trash that inevitably finds its way to heliports and helispots. Even small bits of paper and plastic bags can wreak havoc in engine intakes and the balance of rotor systems.	

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Principles of Working Around a Helicopter (continued)

- The tail rotor is turning considerably faster than the main rotor, it is often close to the ground, and is very hard to see! Like the main rotor, if the tail rotor collides with you it will win and spoil your day!
- Always pick up trash that inevitably finds its way to heliports and helispots. Even small bits of paper and plastic bags can wreak havoc in engine intakes and the balance of rotor systems.
- If you do not have to work around the helicopter, stay 100' or more beyond the safety circle to keep blowing dust out of your eyes and ears.
 - Note: the down wash under the main rotor on a helicopter the size of the UH-60 is well over 100 miles per hour as the pilot increases power and pitch in the blades for take off.
 - This down wash of air rushes out from under the helicopter in all directions and will continue to until departure or arrival is completed.
 - The further you are from the touch down pad, the more the down wash will be dissipated.

Utilizing the External Load Capabilities of Helicopters

- Definitions:
 - A "sling load" is a load of cargo or equipment that is slung beneath a helicopter.
 - There are two types of external load systems that are common to most helicopters - external loads that can not be jettisoned, such as loads in external cargo racks or fixed aerial retardant tanks - and external loads that can be jettisoned, such as cargo carried on the cargo or "belly" hook in a sling load. Generally, US&R Task Forces will be involved in the latter.
 - Because the load can be jettisoned during an inflight emergency, the allowable weight carried on the cargo hook is greater than the weight allowed either internally or externally if it can not be jettisoned.

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Utilizing External Load Capabilities	
■ Definitions:	
• A "sling load" is cargo that is slung beneath a helicopter.	
• Two types of external load systems - external loads that can not be jettisoned, and external loads that can be jettisoned.	
• The allowable weight carried is greater than the weight allowed either internally or externally if it can not be jettisoned.	
• Four basic components in the external load system: the cargo hook, a swivel, a sling or leadline, and a container.	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Utilizing the External Load Capabilities of Helicopters

- There are four basic components in the external load system used to move cargo with a helicopter: the cargo hook, a swivel, a sling or leadline, and a container such as a cargo net or cargo pallet. Together, these components and the cargo make up a "sling load."
- Carrying passengers inside the helicopter and cargo as a jettisonable external load greatly enhances the use of this aircraft.
 - For example, a US&R recon team can carry its necessary equipment on the same flight - whereas there may not be room or allowable weight for both inside the aircraft.
 - The total weight of the passengers, internal and external cargo must not exceed the weight allowed by flight conditions and the aircraft itself as calculated by the pilot or crew chief.
 - Thus, as previously mentioned, the "equipped weight" or total weight of passengers and cargo (including cargo handling gear) is paramount for successful flight accomplishment.
 - Basic principles of utilization include absolute knowledge of the configuration and amount of weight to be moved on each flight.

Common Descriptions of Helicopter Cargo Handling Equipment

- Cargo hook: is attached to the belly of the helicopter. It is FAA and/or DOD approved, self cocking and automatic locking. Although it usually is operated electrically, it can be manually operated by the pilot from the cockpit during emergencies. It has a manual release on the hook to enable checking proper function. It is an integral part of the aircraft.

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HELICOPTER ORIENTATION	
Utilizing External Load Capabilities	
■ Carrying passengers inside the helicopter and cargo as a jettisonable external load is optimal.	
• The total weight of the passengers, internal and external cargo must not exceed the weight allowed by conditions and the aircraft itself	
• The "equipped weight" of passengers and cargo is paramount for successful flight.	
• Basic principles of utilization include absolute knowledge of the configuration and amount of weight to be moved.	
VIEW GRAPH III B - 17	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Common Descriptions of Helicopter Cargo Handling Equipment

- **Swivel:** consists of a ring or link on the upper end, a hook on the lower end, and a swivel section between. A swivel allows the load to rotate while in flight and prevents the leadline from twisting, preventing damage to the leadline cable or chain, or inadvertent release by twisting the hook. The ring or link always goes toward the helicopter and the hook always goes toward the load.
- **Leadline:** is an accessory that connects the load to the helicopter. A leadline consists of a cable constructed of flexible steel cable with a ring or link on one end and a hook on the other. Note that the ring or link always goes up toward the helicopter and the hook always goes down toward the load. Leadlines for most lengths are rated at 3000 and 6000 pounds. The standard length is 12 feet and longer lengths are available. The ultimate strength of a leadline is rated at three times the weight to be carried, at least.
- **Cargo net:** is used to transport cargo suspended beneath a helicopter's cargo hook, permitting delivery without landing. They come in either round or square configurations. These nets are usually constructed from braided polypropylene or nylon rope. Each net consists of a mesh net and a perimeter rope or ropes with tethering rings connecting segments of the perimeter rope. When tension is applied to the perimeter rope, during both load preparation and lifting, the net is pulled closed - similar to a draw string or "purse string." One or two steel rings, attached to the ends of the perimeter rope, become the attachment point to a leadline or directly to a swivel. Cargo nets come in the following commonly used sizes, at 3000 and 6000 pound test:
 - Square nets: 12' x 12' (3000 lbs) or 15' x 15' (6000 lbs)
 - Round nets: 12' diameter (3000 lbs) or 15' diameter (6000 lbs)

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HELICOPTER ORIENTATION

Common Descriptions

- Cargo hook
- Swivel
- Leadline
- Cargo net

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III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Common Descriptions of Helicopter Cargo Handling Equipment

- Pallet: is also used to transport cargo suspended beneath a helicopter, as well as in the cargo holds of airplanes. Pallets commonly used by US&R Task Forces were adopted in 1957 by the US Air Force as part of the standardized 463L system to easily handle cargo for airlift. The cargo pallet is the key to this highly successful system. Note that the overall dimensions of the 463L pallet are 88 inches by 108 inches by 2 1/4 inches thick and it weighs 290 pounds (355 pounds with the cargo nets). The useable upper surface of the pallet is 84 inches by 104 inches, allowing a 2 inch border to attach straps, nets or other restraints. The pallets are made of corrosion resistant aluminum with a soft wood core framed on all sides by aluminum rails with tie down rings. Pallet nets are a standard part of the system and include two side nets and one top net.

Loading Procedures

- General: Always determine the weight of the cargo to be moved and the accumulated or total weight of the entire load - including the weight of the cargo net or pallet and associated gear. Tag the load with destination and total weight. Make sure that boxes are sealed, all containers are closed and straps, buckles and other fittings are secured. Center the weight and make the load as symmetrical as possible. Heavy and less crushable items should be loaded first and placed in the center of the pallet or net. Lighter, softer items can be placed on top or at the sides. Hazardous materials must be placed on the pallet or in the net with the label clearly visible and never buried or hidden.
- Cargo nets: Pull tension on the "purse strings" (the lines that encircle the top or perimeter of the net) to see that they are of even length, in order to attach them to a leadline or directly to a swivel. Check for holes or openings in the net where cargo items could slip through - tie these off if necessary.

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HELICOPTER ORIENTATION	
Loading Procedures	
■ General: Always determine the weight of the cargo to be moved and the accumulated or total weight of the entire load - including the weight of the cargo net or pallet and associated gear.	
■ Cargo nets: Pull tension on the "purse strings" to see that they are of even length.	
■ Pallets: Distribute large and heavy objects evenly from the center of the pallet outward, helping to maintain the center of balance at or near the center of the pallet.	

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Loading Procedures (continued)

- Pallets: Distribute large and heavy objects evenly from the center of the pallet outward, helping to maintain the center of balance at or near the center of the pallet. Construct the load in a square or pyramid shape when possible. Because of the aerodynamics of the flat bottom of a palletized load that is slightly out of balance, they often twist or rotate while in flight. Sometimes by tying a tree branch to the pallet as a tail, the added drag will keep the pallet more stable while in flight.

Information Needed for Cargo Manifests

- For helicopter operations, the accumulated weight of each item of cargo is the most critical issue. A pallet or cargo net that is overloaded for a particular helicopter and/or flight condition is an unacceptable risk. In addition, effective US&R Task Force management will benefit from knowing item by item just what is on each cargo load. As a minimum, a cargo manifest should include: a brief description of each item (Operations Kit #1, 3 each Canimbling pins, Recon' Team Kit #3, etc, etc), the weight of each item, if needed - the person it is going to, the destination of the load and other items unique to a particular disaster situation. Note that this information can be gathered and divided into load lists well before departure times. The US&R Task Force equipment cache lists will provide basic information for the preparation of at-incident cargo manifests.
- Hazardous material that is to be airlifted must be marked and loaded according to agency directives.

Operational Considerations

- During US&R Task Force training, develop priority lists of the order that cargo is to be dispatched for various scenarios. For example "fly away kits" might be developed to contain just those items needed to get a particular discipline on a Task Force underway - from a Staging Area to an Incident operational site.

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Information Needed for Cargo Manifests	
■ The accumulated weight of each item of cargo is the most critical issue. A pallet or cargo net that is overloaded for a particular helicopter and/or flight condition is an unacceptable risk.	
■ Hazardous material that is to be airlifted must be marked and loaded according to agency directives.	
VIEW GRAPH III B - 20	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Operational Considerations (continued)

- Movement of US&R Task Force cargo via vehicles is much less sensitive to weight issues than similar movement by air. Hence, the question of developing lists of "what do I take if going by vehicle or helicopter" becomes a valuable exercise in contingency planning for both individuals and teams within the Task Force. Just as in the manifests for personnel, try to distribute the weight of cargo to be airlifted evenly amongst the planned loads.
- Once pallets or cargo nets are prepared and are ready for airlift, they should be delivered to the heliport and turned over to appropriate loadmasters or Heliport Managers. No additional cargo should be added, or cargo deleted, to preclude the need to re-weigh the load. The loads should be arranged in the marshalling area in the order they are expected to be flown.
- Questions of sequential order or timing may be resolved by asking "will the cargo arrive at the same time or before personnel needing items in that load?" It will be better to have cargo at the arrival point waiting for personnel, rather than personnel waiting for cargo in order to go to work.
- Just as in moving personnel, plan loads so that all of a particular list of cache equipment is not on the same pallet or cargo net. Hence, if a load is punched off the hook in an emergency, or slips off accidentally, all of a particular type of equipment will not be lost to the Task Force. Remember that the cargo manifest will become the source of a reorder if a load is lost.

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HELICOPTER ORIENTATION	
Operational Considerations	
■ Movement of US&R Task Force cargo via vehicles is much less sensitive to weight issues than similar movement by air.	
■ Once pallets or cargo nets are prepared they should be delivered to the heliport and turned over to loadmasters.	
■ Sequential order or timing may be resolved by asking "will the cargo arrive at the same time or before personnel needing items in that load?"	
■ Plan loads so that all of a list of cache equipment is not on the same pallet.	
VIEW GRAPH III B - 21	

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

RAPID INTERVENTION PALLET AND HELICOPTER OPERATIONS

Introduction

- Task Forces deployed to Atlanta during the Olympic Games to be on standby in case of an emergency were challenged to assemble a rapid-intervention pallet which would be transported by a military Blackhawk helicopter. They were given this assignment without prior warning, and each task force came up with a different solution.
- The only parameters the Logistics Specialists were given was to load a pallet with no more than 2,000 pounds of gear stacked no higher than 48 inches.
- An underlying problem with the exercise was the lack of clear mission given to the Task Forces, which would have gone far to delineate what cache gear would be taken. Unanswered questions included:
 - What type of mission was it?
 - Was it for a nine-person Reconnaissance Team, as some Task Forces surmised, or could the gear be used to meet the needs of 12 to 18 personnel, as one Task Force decided?
 - Would the personnel be required to haul the gear on their backs once they arrived, or was a vehicle waiting? One task force designed the load in a three-tier, modular format to cover everything from outfitting nine personnel with gear limited to what they could carry on their backs. Limiting the load in this way solved the security issue for any cache items left behind on the pallet. Another possibility would be that further gear and more personnel would be delivered via truck within hours of the pallet's transport. How did this change what was selected?
- Some task forces loaded the pallets until they had 2,000 pounds stacked 48 inches high. Was all of this equipment necessary, or were they simply filling out a load?
- Is there even agreement regarding what the operational capabilities of the Reconnaissance Team should be?

III. CACHE TRANSPORTATION — AIR

B. HELICOPTER ORIENTATION

Introduction

While there were some frustrating moments for Task Force personnel, the process could be seen as a positive experience in that this may be the type of challenge thrown at Task Force Logistics Specialists as they endeavor to get equipment and personnel from one point to another during a mission. It may be the only way to accomplish this is to use the services of an available helicopter, and the personnel assigned to the Logistics function needs to be flexible and innovative.

The issue of rapid-intervention pallets comes down to two major factors:

- a clearly defined operational mission to which Task Force leadership can assign an appropriate response of personnel with operational objectives, and
- clear information regarding the load-carrying limitations of the helicopter, so that Logistics Specialists may design the load to meet operational and safety requirements.

The role of rapid-intervention pallets is still undeveloped and largely unexplored on a task force-wide level. Any policy decisions need to come from the joint efforts of both Task Force Management and the Logistical function.

Attached are two methods of loading the rapid-intervention pallets, as worked out by Task Force Logistics Specialists in Atlanta. They serve only as initial points of discussion.

Solution No. 1: CA-TF2

Using a four-point harness, a standard Air Force 463L pallet carried a variety of equipment from several task force functions. The load was designed to support 12 to 18 personnel, who would fulfill the role of the traditional Reconnaissance Team, plus have a minimal Rescue capability in case lightly trapped victims were found. The starting point was the Recon Kit, supplemented by the items outlined below.

For the Search function, equipment was packed which would provide a quick surface look: fiber optics, Search Cam, Life Detector and the Palmeroy coring tool.

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Solution No. 1: CA-TF2 (continued)

For the Rescue function, the pallet carried: two high-pressure air bags, the Stanley powerpack with pneumatic hammer and chain saw. In addition, chain saws and a selection of hand tools was packed. These items would allow rescuers to cut and lift debris in order to free lightly trapped victims close to the surface.

The load included backpacks and defibrillators for Medical Specialists. This component was kept limited because the scenario indicated that a DMAT team was operating on the site.

For the Technical function; haz mat monitors and a set of Class A entry suits were on hand to pull task force personnel out if they entered a contaminated environment. The load also included some reference texts and tools were packed for the Structural Specialists, and extra radios and miscellaneous items for Communications.

Logistical needs were met with required fluids and fuel for the power equipment and a basic T-card system.

The drill scenario concluded with the rest of CA-TF2's cache and remaining operational personnel being transported by trucks to the site. However, if needed, the entire cache could be transported by sling load using the same height and weight limitations and successive helicopter trips.

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Solution No. 2: VA-TF2

Recon Cache Development

The purpose of the recon cache is to develop a list of items which will be utilized by the Recon Team when it is deployed. Identifying these items prior to a mission will enable the Recon Team to be placed into action quickly once the task force has arrived on-site. In order for this to be successful, these items must be located in an easily accessible location within the cache.

Modes of Transportation

The mode of transportation available is another consideration when planning the recon cache. Some different modes used in past missions include; helicopter, stake-body truck, pickup truck, panel truck, and forklift. You must consider what is available to the Recon Team and preplan how you will move the equipment based on the limitations of the available transportation.

Developing the Recon Cache List

Establish a committee of personnel from each function and meet to discuss the development of the recon cache. You must review with each function what their responsibilities are during a recon mission. If the mission is not clear to them, they will compensate by including a lot of unnecessary equipment when they make their list for the recon cache. Another factor they need to be aware of is whether there will be sufficient personnel to *carry* the recon cache when it is assembled.

If the committee members keep these two factors in mind, they will develop a comprehensive, yet practical recon cache list. Once the list from each function is submitted, develop the final cache list. When we added the transportation element, we found the best plan was to develop a recon cache which could be tailored to the available mode of transportation, whether it was a pickup truck or a full-sized panel truck.

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Developing the Recon Cache List

■ **Option 1 - Recon Team only**

This option most closely resembles the recon scenario as outlined in the FEMA US&R Task Force FOG Manual. The Recon Team is responsible for reconnaissance utilizing the Search component, with support from the Rescue component. VA-TF2 assigns an entire Rescue Squad to the Recon Team in order to eliminate the separation of squad personnel. The equipment carried in this level of recon cache is selected to support the Search component and perform very light rescue operations. If additional equipment is needed once a victim is located, the request for additional equipment and personnel will be initiated.

■ **Option 2 - The Entire Task Force**

The equipment selected for this assignment will be based strictly on the available mode of transportation. The movement of the entire cache to be set up on-site is the best operation. This enables Logistics personnel to manage all equipment on site. If the cache is moved in small increments, primary and secondary caches must be established. The primary cache can be sited where the majority of the cache will be used, with the secondary cache sited at a remote location. If additional equipment is needed on site, a request will go from the primary cache to the secondary cache.

■ **Option 3 - Limited Transportation Availability**

This option will be utilized when a mode of transportation limits the quantity of equipment that can be moved to the site. The limit may be due to the limited number of , for example, helicopters available, or because of the limited payload of the mode of transport.

In this case, Logistics Specialists must evaluate what personnel resources will be utilized and then decide what equipment resources will be needed at a minimum in order to operate. The final issue to be addressed is, in the case of transport of the Recon Team and its cache by helicopter, the portability of the recon cache. Since there will be no spare personnel to guard the cache, the personnel must be able to carry all equipment transported with them, and they may not be able to count on a pickup on-site to support them once they arrive.

III. CACHE TRANSPORTATION — AIR
B. HELICOPTER ORIENTATION

Developing the Recon Cache List

■ **Option 3 - Limited Transportation Availability**

This option may be finalized on-site at the last minute. However, the success of the option depends on the in-depth knowledge of the operations of each function in order to pare the cache down to the most necessary items only. Moreover, the cache boxes must be packed in order to expedite the staging of the equipment to be transported. Obviously, planning play a large role in this process.

Placement of Recon Cache Items on the 463L Pallets

Placement of the items included in the recon cache should be planned prior to building the pallets. These items should be placed at the top of pallets so they are easily accessible. This allows the Recon Team to be mobilized with very little unloading of the pallets.

In addition to loading the items at the top of the pallets, they should also be loaded on only two or three pallets. This, again, reduces the number of pallets to be uncovered and have nets removed.

Storage of Recon Cache Items

Develop kits with recon items in certain boxes. These boxes can be labeled and easily recognizable as a recon box. This allows for easy movement of the recon cache by any task force member as the Recon Team itself is briefed and begins to plan operations.

Conclusion

These are some simple ideas to develop the recon cache. It is very import that the Logistics Specialist design the three-option plan based on the recon cache equipment list developed by the committee members. The development of these particular options will keep the Logistics personnel from having to dismantle numerous pallets when a Recon Team is ready to deploy.

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

463L Pallet Information

■ Description

- The 463L master pallet is made of corrosion-resistant aluminum with a balsa wood core frame on all sides by aluminum rails. The rails have 22 steel tie down rings attached in such a manner that there are six rings on each long side and five on each short side (rated at 7500 lbs each).
- The rails also have indents which are designed to accept the detent locks located on numerous types of material handling equipment and are found on board all airlift capable aircraft. The overall dimensions of the 463L pallet are 108" wide x 88" long x 2 1/4" thick. Empty pallet weighs 290 lbs., 355 lbs. with full nets.

■ Inspection

- Inspect pallets and nets to assure serviceability. Do not use pallets if the aluminum skin is separating from the surface. The skin-to-rail bond is an important portion of the pallets strength.
- Use pallet with minor dents ,gouges, and scratches that do not fracture the skin. For more extensive damage (such as warping, bent rails or damaged/missing tie-down rings) , the pallet must be sent for repairs.
- Keep pallet as clean as possible in order to protect the spread of insects, dirt born infestations, etc. Do not use nets if they are wet or have any rips, excessive corrosion, missing hooks or rings, rusted or bent rings, bad stitching, frayed straps, or damaged hooks.

■ Dunnage

- Wood placed between cargo and pallet or wood that's used to get clearance between the ground and pallet thus allowing the forks of a forklift to pass underneath.
- Always put adequate dunnage under the pallet by installing a minimum of three 4" x 4" x 88" pieces under each loaded pallet. this will aid in the movement of the pallets and will protect the lower surface from damage.
- Not using adequate dunnage will cause a warping affect to the pallet. (Dunnage must accompany pallets during shipment.)

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PALLET BUILD UP	
463L Pallet Information	
■ Description	
• The 463L master pallet is made of corrosion-resistant aluminum with a balsa wood core frame on all sides by aluminum rails.	
FEMA US&R RESPONSE SYSTEM	
LOGISTICS SPECIALIST TRAINING	10/98
• The rails also have indents which are designed to accept the detent locks located on numerous types of material handling equipment and are found on board all airlift capable aircraft.	
463L Pallet Information	
FEMA US&R RESPONSE SYSTEM	
LOGISTICS SPECIALIST TRAINING	10/98
■ Inspection	
• Inspect pallets and nets to assure serviceability. Do not use pallets if the aluminum skin is separating from the surface.	
463L Pallet Information	
• Use pallet with minor dents, gouges, and scratches that do not fracture the skin.	
■ Dunnage	
• Wood placed between cargo and pallet or wood that's used to get clearance between the ground and pallet thus allowing the forks of a forklift to pass underneath.	
VIEW GRAPH III C - 2	
• Always put adequate dunnage under the pallet by installing a minimum of three 4" x 4" x 88" pieces under each loaded pallet.	
• Not using adequate dunnage will cause a warping affect to the pallet.	

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Pallet Limitations

- The pallet must be used right-side up. The usable dimensions of the 463L pallet is 104" wide x 84" long. This allows for 2" around the periphery of the pallet to attach straps, nets, or other restraint devices.
- Maximum load capacity is 10,000 pounds. the desired load capacity is 7,500 pounds to prolong pallet life. Normal height is 96" from the surface of the pallet. The surface of the pallet has 250 psi limit for all types of cargo.
- The pallet shall not be diverted to other uses, such as bunker roofs, hole covers, bridges, floors of tents, etc. They may be stored in stacks of up to 20 pallets, with the bottom pallet placed on adequate dunnage. Never stack pallets upside down as the rings can puncture the skin of the pallet.

Nets

- A complete set of nets consist of two side nets, which are identified by their green color, and one yellow top net. A complete set of nets weigh 65 pounds and is capable of restraining 10,000 pounds.
- Protect nets from adverse climatic conditions. The netting materials will mildew and deteriorate. The metal hooks will also rust if not properly cared for.

Pallet Covers

- Pallets covers are required on all 463L pallets for air shipment. These covers will also keep contents on pallets dry during loading and offloading periods.
- The cover has a pocket that will open when faced into the wind or by running towards the pallet. The cover will completely cover the contents of the pallet.

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PALLET BUILD UP	
Pallet Limitations	
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pounds, the desired load capacity is 7,500 pounds to prolong pallet life.	
■ The pallet must not be diverted to other uses, such as bunker roofs, hole covers, bridges, floors of tents, etc.	
PALLET BUILD UP	
Nets	
VIEW GRAPH III C - 4	
FEMA US&R RESPONSE SYSTEM ■ A complete set of nets consist of two side nets, which are identified by their green color, and one yellow top net. A complete set of nets weigh 65 pounds and is capable of restraining 10,000 pounds.	
PALLET BUILD UP	
■ Protect nets from adverse climatic conditions. The netting materials will	
mildew and deteriorate. The metal Pallets covers are required on all 463L hooks will also rust if not properly pallets for air shipment. These covers cared for.	
will also keep contents on pallets dry during loading and offloading periods.	
VIEW GRAPH III C - 5	
■ The cover has a pocket that will open when faced into the wind or by running towards the pallet.	
■ These pallets can be obtained through your nearest Air Force base .	
■ If possible, always carry an extra box to the disaster with your task force cache. They will come in handy.	

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Pallet Covers (continued)

- These covers may be obtained through your nearest Air Force base and come 20 to a box.
- If possible, always carry an extra box to the disaster with your task force cache. They will come in handy. Order covers using the following code:
 - Cover, plastic, pallet 463L HCU-E 3990-00-930-1480

Pallet Build-Up

- There is technique involved when placing task force cache items and personal gear on Air Force pallets for air transport. Become familiar with the following guidelines; this will make the pallets better loaded and easier to secure while gaining the confidence of Air Force personnel performing the final inspection.
- General Guidelines:
 - Make sure the pallet is right side up. If the cargo is not placed on the top, the pallet lip will not hook into the rail system and slide up the rollers in the aircraft cargo bay.
 - Keep pallets and nets off damp ground and out of the weather. If wet, hang out in sun to dry.
 - Do not push or slide pallets over materials which could damage the skin.
 - Load all dense, boxed, or crated cargo on pallet first. Constructing the load in a square or pyramid shape makes the load more stable and easier to secure on the pallet.
 - Palletize cargo from the heaviest to the lightest, distributing large and heavy objects evenly from the center outwards and bottom to top to prevent the pallet from becoming unevenly weighted. This results in a weight and balance problem.
 - Always protect the upper surface of the pallet from sharp-edged cargo. If the cargo has any sharp edges or protrusions, insert adequate cushioning materials between the cargo and the pallet to prevent damage. Cover pallet surface with 3/8" plywood before loading.

FEMA US&R RESPONSE SYSTEM	
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PALLET BUILD UP	
■ General Guidelines:	
• Make sure the pallet is right side up.	
• Keep pallets and nets off damp ground and out of the weather.	
• Do not push or slide pallets over materials which could damage the skin.	
• Load all dense, boxed, or crated cargo on pallet first.	
• Palletize cargo from the heaviest to the lightest, distributing large and heavy objects evenly.	
• Always protect the upper surface of the pallet from sharp-edged cargo.	

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Pallet Build-Up (continued)

- Crushable and light-density cargo should be stacked on top or along side of the boxed and crated cargo. NOTE: use caution with this so you don't crush cargo with tie downs on tractor/trailers.
- Small wheeled items or skidded cargo should be restrained separately to the pallet in addition to the net.
- Cargo with special labels should be placed upright and facing outward whenever possible.
- Cargo should be stacked within the 84-inch by 104-inch boundary.
- When placing hazardous cargo on the pallet, place it on the shorter (88-inch) side of the pallet.
- The cargo is required to be weatherproofed, so place the plastic cover over it.

- **Off-balanced loads** — loads which are not evenly distributed over a pallet. The pallet may appear to be evenly loaded, in that the load is squared off at 96 inches in height on all sides. However, if the weight of the individual items forming the load is not considered, there may be much more weight on one side of the pallet in comparison with the other. A consequence of this may be the load could fall off the tines of the forklift because of the lack of counterbalancing,. Even worse, off-balanced pallets unevenly load the aircraft. During the pallet load planning process, Logistics Specialists must ensure that pallets are evenly loaded.

- **Center of balance of pallets** — to avoid building pallets with off-balanced loads, the center of balance of the pallet load must be within 14 inches of the center of the pallet.

- **Pyramid placement technique** — a method of pallet load placement in which the heaviest items are placed on the bottom of the load evenly across the pallet, and lighter items are placed in the center of the pallet and stowed vertically. This method helps to evenly distribute the pallet load.

- **Married pallets** — a pallet loading method used when the load is too long to fit on one pallet. Two pallets are coupled together, and the load is secured across the two pallets. This method *should not* be used for US&R cache transport purposes.

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CACHE TRANSPORT	
PALLET BUILD UP	
General Guidelines: • Crushable and light-density cargo should be stacked on top or along side of crated cargo. • Small wheeled items or skidded cargo should be restrained separately to the pallet. • Cargo with special labels should be placed upright and facing outward whenever possible.	
FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING 10/98	CACHE TRANSPORT • Cargo should be stacked within the 84-inch by 104-inch boundary. • When placing hazardous cargo on the pallet, place it on the shorter (88-inch) side
PALLET BUILD UP	
VIEW GRAPH III C - 8	
Off-balanced loads — loads which are not evenly distributed over a pallet. During the pallet load planning process, Logistics Specialists must ensure that pallets are evenly loaded.	
Center of balance of pallets — the center of balance of the pallet load <u>must be within 14" inches of the center.</u>	
Pyramid placement technique — placement in which the heaviest items are placed on the bottom of the load evenly across the pallet.	
Married pallets — method used when the load is too long to fit on one pallet.	

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

PALLET TIE DOWN TECHNIQUES

Tall-Profile Pallet

- A high-profile pallet is described as any pallet built above 96 inches to 100 inches in height. Remember: A pallet can weigh up to 10,354 pounds at 96-inches high. However, you may exceed that height limit -- up to 100 inches -- if the pallet weight is 8,000 pounds or less.

- Items needed for the tall-profile pallet:

- (2) side nets
- top net
- plastic pallet cover

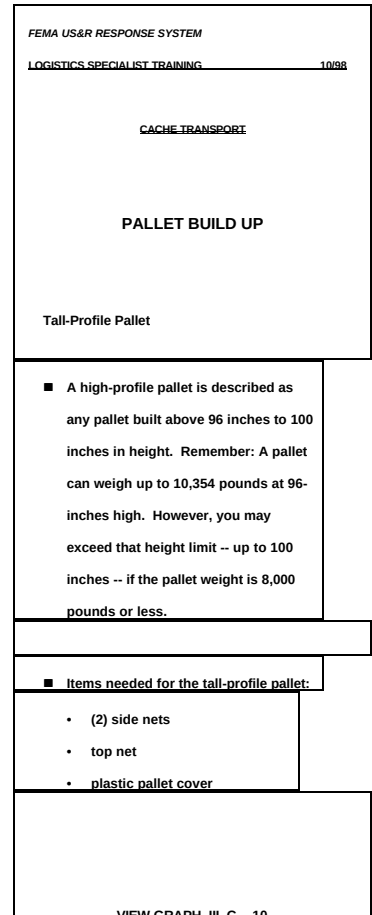
- Netting Procedure:

Step 1: Stretch each net out on the ground next to the pallet. Inspect each net.

Step 2: Stand in front of one short (88-inch) side of the pallet. Remember that the stenciled letters must appear on the outside of the net once the net is secured to the pallet. Starting with the hooked end of the side net, hook the first hook, starting on the last ring on the long (108-inch) side. Finish hooking until you come to the corner of the pallet and remember to skip the last ring, so that there is a criss-cross on each corner of the pallet.

Note: There is a maximum $\frac{1}{2}$ twist in the net where the criss-cross occurs. A full twist is not accepted. One side net will cover two sides of the pallet. Follow the same procedures for the second side net. All hooks should be used and should be facing towards the inside of the pallet. There may be some hooks that are facing outward -- this is acceptable as long as the stenciled letters are on the outside of the side net.

Step 3: Stretch the nets as high as you can on the cargo. You will find that the natural tension of the nets will hold the nets up in most cases. It may be necessary to adjust the middle straps of the side net.



III. CACHE TRANSPORTATION — AIR
C. PALLET BUILD UP

Tall-Profile Pallet (continued)

- Step 4: Stretch the end of the side nets as high as you can on their respective corners. You can accomplish this by connecting the hook from one net to the corresponding ring of the next net. The best way to do this is by finding the top hook and securing it to the top ring. Then, secure the rest of the rings and corresponding hooks.
- Step 5: Go back to the middle of the two side nets and pull out all the slack that you can. It is difficult to tighten, and may require some backing out of the strap before you can snug it. These are tightened at this point because it is nearly impossible to do once the top net is in place and secured.
- Step 6: Stretch the top net out on the floor. Inspect it, noting the five-hook and four-hook sides. Remember, the stenciled words on the net must be visible once it is in place on the pallet. Also, make sure that you place the four-hook side on the short side of the pallet and the five-hook side on the long side of the pallet.
- Step 7: Walk around the pallet and position the top net so that an equal amount of net extends over each side. Secure each hook to its corresponding ring on the side net. Depending on the height of the pallet, you may have to use the large rings in the center of the side net. With two people on either side of the same strap of the top net, pull at the same time to ensure an even snugness. Make sure that the belly-band straps of the top net are fastened at each corner.
- Step 8: Walk around the pallet and tuck in all loose, hanging straps that could become caught in the rail system. When you tuck them in, do not tie them in knots.
- Step 9: Make a placard indicating pertinent data and affix it to one 88-inch side. Do not use more than one placard. Air Force Form AF-2279 — Pallet Identifier.

III. CACHE TRANSPORTATION — AIR
C. PALLET BUILD UP

Medium-Profile Pallet

- A medium-profile pallet is described as any loaded pallet built above 54 inches yet not tall enough to need a top net.
- Items needed for a medium-profile pallet:
 - (2) side nets
 - (7) CGU-1/B cargo devices (cargo straps)
 - plastic pallet cover
- Netting Procedure:

Step 1 Place the side nets the same way as Steps 1 through 5 above.

Step 2 Separate the seven straps so that you have four for the long side of the pallet and three for the short side of the pallet.

Step 3 Hook the cargo straps to the top rings of the side nets, unless the top rings are too close to completely tighten the cargo straps. In this case, use the larger rings in the middle of the side nets.

Step 4 Run the cargo straps directly across the load, securing the other end in the corresponding ring on the other side.

Step 5 Tighten the straps.

Step 6 Tuck in any loose straps.

Step 7 Placard the pallet on one long side as necessary.

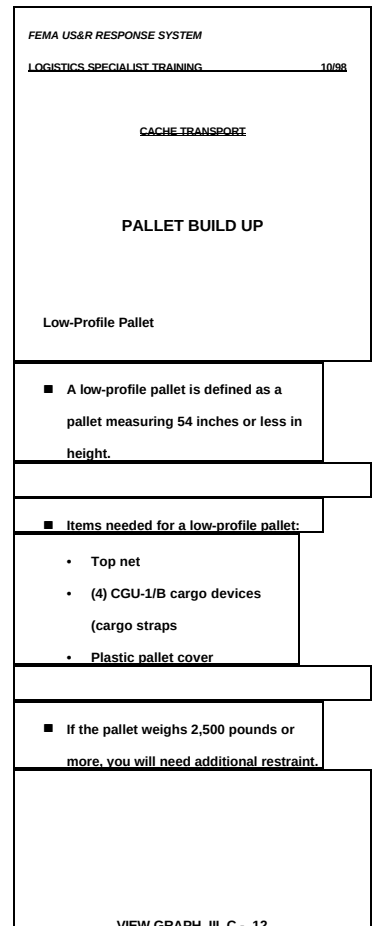
FEMA US&R RESPONSE SYSTEM	
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PALLET BUILD UP	
Medium-Profile Pallet	
■ A medium-profile pallet is described as any loaded pallet built above 54 inches yet not tall enough to need a top net.	
■ Items needed for a medium-profile pallet:	
• (2) side nets	
• (7) CGU-1/B cargo devices (cargo straps)	
• plastic pallet cover	
VIEW GRAPH III C - 11	

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Low-Profile Pallet

- A low-profile pallet is defined as a pallet measuring 54 inches or less in height.
- Items needed for a low-profile pallet:
 - Top net
 - (4) CGU-1/B cargo devices (cargo straps)
 - Plastic pallet cover
- If the pallet weighs 2,500 pounds or more, you will need additional restraint.
- Netting Procedure:
 - Step 1 Lay out to top net and inspect it. Ensure the stenciled letters will be visible when you lay the net across the cargo. The net's five-hook side is placed on the long side of the pallet and the net's four-hook side is placed on the short end of the pallet. Note: There will one ring not used on each corner of the pallet.
 - Step 2 Place the net over the cargo and make sure that it even and hooked to the contour of the cargo.
 - Step 3 Place the cargo straps so that each hook goes to the corresponding ring on the opposite side of the pallet, forming a criss-cross along the sides of the cargo. Refer to illustration. If the pallet weighs more than 2,500 pounds, you will need additional restraint.



III. CACHE TRANSPORTATION — AIR
C. PALLET BUILD UP

Pallet Quality Control Checklist

- Wear gloves, remove watches, rings, bracelets etc. Have steel toed shoes.
- Is the pallet free of damage: warping, delamination, punchers, rail damage?
- Are there 3 pieces of dunnage under each pallet?
- Is the pallet /cargo clean and/packed properly?
- Is the cargo free of protrusions such as nails, screws, etc.? That would make it dangerous to handle.
- Is all special handling cargo properly certified on IATA Shipper's Declaration for Dangerous Goods?
- Is all special handling cargo placed on the 88" side of the pallet so that it is accessible in case of an inflight emergency?
- Is shoring used between cargo with high density points exceeding 250 psi?
- Is the cargo placed evenly on the pallet, so that weight is not concentrated, on one side?
- Are pallets destined for a C-130 built with a 6" aisle way along one 88" side of the pallet?
- Does the pallet exceed 96" in height?
- Is pallet cover in use?
- Are the side nets properly placed so that corner hooks crisscross on each corner?
- Are all net straps properly cinched to provide uniform tension?
- Are all loose hanging straps tucked (NOT TIED) so that they will not interfere with the Aircraft rail system?

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Pallet Quality Control Checklist (continued)

- Is a placard affixed to one 88" side and one on 108" side?
- Are all hooks upright, and not hanging over the edge of the pallet?
- Are hazard labels (If Any) clearly visible from the outside of the pallet?
- Has a quality control inspection been made before releasing pallets to the Air Cargo Terminal?

Determining Pallet Weight

- The three basic ways to weigh a pallet are listed below:
 - A forklift which has built-in scales in the lifting mechanism. However, these units are rare, and the scales are often uncalibrated because of overuse.
 - A pair of hand-carried pallet scales. To use them, remove the center piece of dunnage, replacing it with two pieces of dunnage placed at right angles to the remaining pair. This makes the dunnage form a square. Then, place the pair of hand-carried scales, one on each replacement dunnage. Lay the pallet on the dunnage and remove the forklift. Take the reading from each of the two scales and add to obtain the total pallet weight.
 - Highway or truck scales.

Pallet Weight Markings

- Use two (2) AF Form 2279, *Pallet Identifier*, per pallet.
- Fill them out as required, and place one on a long side of the pallet and the other on a short side of the pallet.

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CACHE TRANSPORT	
PALLET BUILD UP	
Determining Pallet Weight	
■ The three basic ways to weigh a pallet:	
FEMA US&R RESPONSE SYSTEM LOGISTICS SPECIALIST TRAINING A forklift which has built-in scales in the lifting mechanism. However,	10/98
CACHE TRANSPORT	
• A pair of hand-carried pallet scales. To use them, remove the center piece of dunnage, replacing it with two pieces of	
dunnage placed at right angles to the remaining pair.	
Pallet Weight Markings	
■ Use two (2) AF Form 2279, <i>Pallet Identifier</i>, per pallet.	
VIEW GRAPH III C - 13	
■ Fill them out as required, and place one on a long side of the pallet and the other on a short side of the pallet.	

III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Material Handling Equipment (MHE)

■ Definition

- Material handling equipment (MHE) includes the classes of vehicles and other devices used to aid in the packaging, handling, transporting and other manipulating of cargo in preparation for air shipment. The following is the most commonly used equipment.

■ Availability

- Because the USAF is a full-time transportation agency, its inventory of MHE is quite large. However, even with a large inventory, the needs of all units cannot be met with in-place assets. Moreover, the repositioning of MHE from base to base is expensive. Therefore, Logistics Specialists must be aware that the unit at their POD may have to plan and make arrangements for the availability of adequate MHE to be in place when the mobilized cache arrives.
- This issue may also create delays at the POA near the affected jurisdiction. For this reason, individual cache boxes and other components are designed to be manageable for a manual unloading of 463L pallets.

Descriptions of MHE

■ Forklifts

- Forklifts are used to lift, transport and stack cargo or equipment. Their use saves money and many staff hours of labor in the handling of cargo. Forklifts are located at nearly every military installation in the continental United States (CONUS) and around the world.

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PALLET BUILD UP	
Material Handling Equipment	
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LOGISTICS SPECIALIST TRAINING	affected jurisdiction.
CACHE TRANSPORT	
VIEW GRAPH III C- 15	
PALLET BUILD UP	
■ Forklifts	
are used to lift, transport and stack cargo or equipment. Their use saves money and staff hours of labor in the handling of cargo.	
■ 4-K Forklift	
- Use in warehousing, storage and shipping operations. It is used primarily in palletizing, depalletizing and loading of secondary cargo on vehicles. - The only 4-K forklift authorized to operate on the cargo ramp	
is the MHE 237, MC-4K-R1	
(rough terrain) forklift.	

III. CACHE TRANSPORTATION — AIR
C. PALLET BUILD UP

Descriptions of MHE (continued)

■ **4-K Forklift**

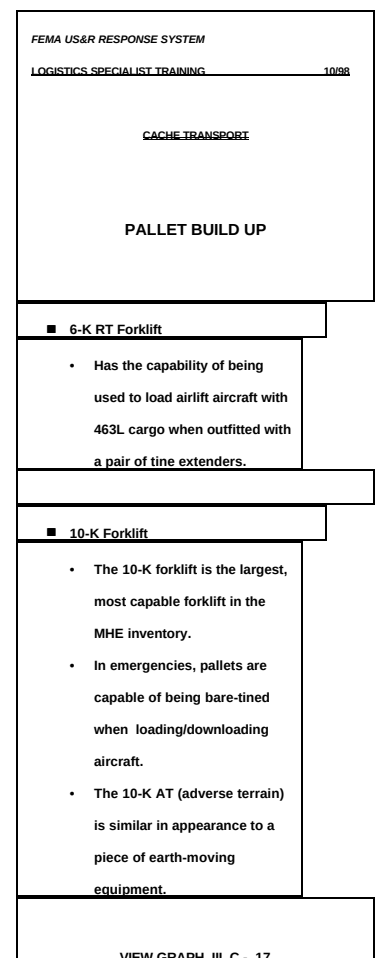
- Designed for use in warehousing, storage and shipping operations. Within the air terminal area, it is used primarily in palletizing, depalletizing and loading of secondary cargo on vehicles. It is capable of lifting and transporting up to 4,000 pounds of cargo. Easily maneuverable in tight places, its only disadvantage is its relatively low load-carrying capacity.
- The only 4-K forklift authorized to operate on the cargo ramp, or inside the cargo compartment for loading or unloading cargo is the **MHE 237, MC-4K-RT (rough terrain) forklift** (Marine Corps issue). However, special precautions must be made prior to use.

■ **6-K RT Forklift**

- Considerably larger than the 4-K forklift, these vehicles are usually found only on US Army and Marine Corps installations. Designed to aid in the buildup and rapid movement of air transportable cargo, it has the capability of being used to load airlift aircraft with 463L cargo when outfitted with a pair of tine extenders. While it carries half again as much cargo as the 4-K forklift, it still has the disadvantage of having a relatively limited payload.

■ **10-K Forklift**

- Similar to the 4-K forklift in appearance, the 10-K forklift is the largest, most capable forklift in the MHE inventory. Like the 6-K, this unit is capable of lifting and loading full-loaded 463L pallets aboard airlift aircraft. When doing this, use the rollerized tines on the forks to avoid damaging the pallets.
- Note: In emergencies, pallets are capable of being bare-tined when loading/downloading airlift aircraft.
- The 10-K AT (adverse terrain) forklift is similar in appearance to a piece of earth-moving equipment, with fork tines substituting for the earth-moving bucket. NOTE: forklift operators must be trained and licensed before operating equipment.

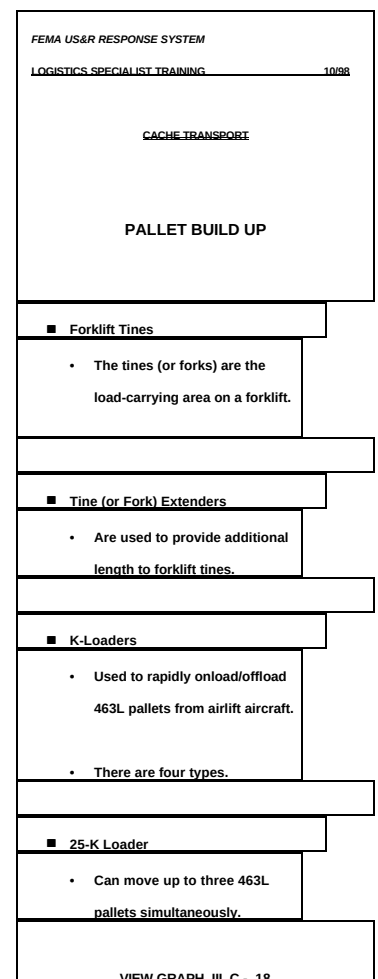


III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Descriptions of MHE (continued)

- **Forklift Tines**
 - The forklift tines (or forks) are the load-carrying area on a forklift.
- **Tine (or Fork) Extenders**
 - Tine extenders are used to provide additional length to forklift tines. The technical publications that govern loading procedures for aircraft require forklift tines to be a minimum of 72 inches (six feet) in length. Tine extenders provide this additional length. Tine extenders come in two versions:
 - **rollerized** - useful for the rapid handling of 463L pallets, and
 - **bare** - useful in pallet buildup and the placement of secondary cargo in the bed of a vehicle. Caution: tine extenders can/will alter the balance and load capability of all forklifts.
- **K-Loaders**
 - K-loaders are used to rapidly onload/offload 463L pallets from airlift aircraft. They are designed to interface with, and be part of, the 463L System.
 - There are four types of K-loaders, each with its own capabilities, advantages and limitations. All units are large and heavy, with availability limited at some installations.
 - Anytime a K-loader is needed, your contacts at the POD and POA will need to begin coordinating its availability early in the operation.
- **25-K Loader**
 - While operating within its maximum cargo weight limit of 25,000 pounds, the 25-K Loader can move up to three 463L pallets simultaneously on its deck. The deck can be raised, lowered and tilted forward and aft in order to align with aircraft floors.
 - The deck has rows of recessed rollers installed the entire length of the vehicle. These rollers smoothly convey palletized loads, yet can be stowed to provide a continuous, smooth deck surface to handle non-palletized loads.



III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Descriptions of MHE (continued)

- Guide rails run the entire length of the deck to ensure alignment of the 463L pallets with the aircraft rail system. Locks are installed in the rails to secure the pallets during movement.
- The 25-K Loader can be transported on the C-130, C-141, or C-5 aircraft.

■ TAC-Loader

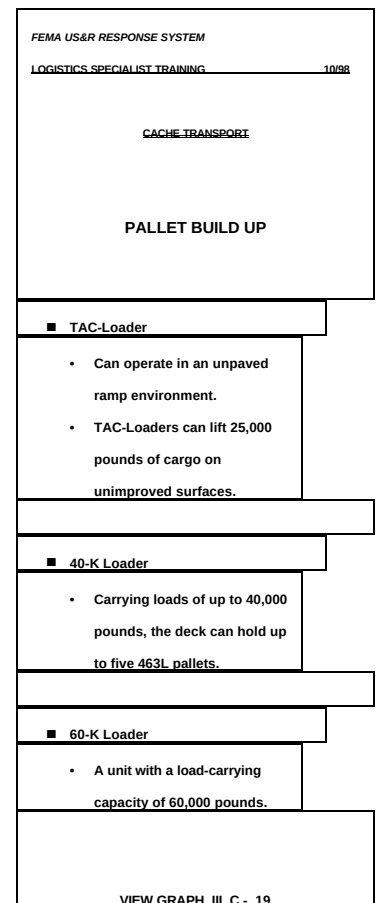
- The 25-K TAC-Loader has the same capabilities as the 25 K-Loader, except that it also can operate in an unpaved ramp environment. Moreover, it is the easiest of the K-loaders to air transport.
- TAC-Loaders can lift 25,000 pounds of cargo on unimproved surfaces and a maximum of 38,000 pounds on smooth, paved surfaces. The vehicle can normally hold three 463L pallets, and can be modified with extensions to hold up to five pallets.
- The TAC-Loader's deck has the same rollers and maneuverability for loading as the 25 K Loader.

■ 40-K Loader

- While having increased capacity over the other two loaders, the 40-K Loader is not designed to be routinely air transported. In addition, its extreme size makes it difficult to transport by surface road. However, once in place, it is a very efficient MHE, rapidly loading and unloading cargo-capable aircraft. Carrying loads of up to 40,000 pounds, the deck can hold up to five 463L pallets.
- The deck is outfitted with the same equipment as the other loaders.

■ 60-K Loader

- A unit with a load-carrying capacity of 60,000 pounds.

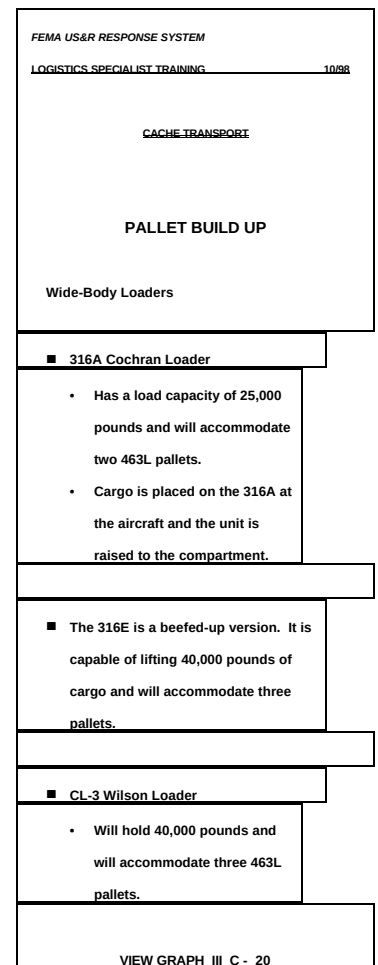


III. CACHE TRANSPORTATION — AIR

C. PALLET BUILD UP

Wide-Body Loaders

- When commercially designed wide-body aircraft, such as the Boeing 747, DC-10 and KC-10, began to be used air cargo, it was found that K-Loaders could not reach the height of their cargo floors. Moreover, none of the aircraft were equipped with cargo loading ramps, so they would require a wide-body loader for these operations. New MHE had to be developed.
- There are currently three types of wide-body loaders used by the Air Force, and all are transportable aboard a C-130, C-141, or C-5. Being elevator-type loaders, note that none of these MHE will not be used to transport cargo along horizontal surfaces.
- **316A Cochran Loader**
 - The 316A Cochran Loader is a commercially designed elevator loader used extensively in support of the KC-10. It has a load capacity of 25,000 pounds and will accommodate two 463L pallets.
 - When loading, cargo is placed on the 316A at the aircraft and the unit is raised to the aircraft cargo compartment.
 - The 316A has been modified to mate with C-141 auxiliary loading ramps for the purpose of loading wheeled items of cargo. When pallets are being loaded, the 463L pallets must be transferred from forklifts and/or K-loaders to the Cochran Loader.
- The 316E is a beefed-up version of the earlier A model. It is capable of lifting 40,000 pounds of cargo and will accommodate three pallets. It is the most commonly wide-body loader located at most MAC bases.
- **CL-3 Wilson Loader**
 - The CL-3 Wilson Loader is the newest of the wide-body loaders. It will hold 40,000 pounds and will accommodate three 463L pallets.



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Rollerized Flatbed Trucks

- Rollerized flatbed trucks facilitate the speedy handling of palletized cargo, particularly when K-loaders are not available. The come in a variety of sizes, lengths and load-carrying capabilities.
- Most flatbed trailers (not lowboys) may be modified by attaching lengths of rollers to accommodate the building, transporting, storing and loading of cargo on 463L pallets.

