
**AERIAL DELIVERY & FIELD
SERVICES DEPARTMENT
“HOW TO” REFERENCE HANDBOOK**



**AERIAL DELIVERY & FIELD SERVICES DEPARTMENT
QUARtermaster SCHOOL, FORT LEE, VIRGINIA
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CHAPTER 1 INTRODUCTION TO AERIAL DELIVERY

The intent of this guide is to help officers understand their capabilities & successfully place correct personnel and equipment in position to supply units as needed through airdrop and sling load operations.

Officers are *highly encouraged* to seek out the Senior Airdrop System Technicians MOS 921A or senior NCO parachute rigger MOS 92R skill level 4/5 prior to planning any airdrop mission. Additional regulations and POCs at the Rigger School House: Aerial Delivery and Field Services Department (ADFSD) are located on the back of the guide.

A major challenge is creating a common understanding between your unit and the supported units. From rigging capabilities and requirements to airborne operations in general, the more they understand the easier it will be for receiving support (heavy drop rigging details, parachute shake-out, etc.).

Vital Aerial Delivery References:

- **ATP 4-48:** Joint Airdrop Inspections (JAIs), Malfunction Officer Duties & Investigation, Reporting Requirements & Procedures, & Air force JAIs
- **AR 56-4:** Material Distribution Processes and Equipment, Integrated Logistics Aerial Resupply (ILAR), Distribution Visibility and Distribution of HAZMAT
- **AR 190-51:** Security requirements for parachutes and aerial delivery equipment
- **AR 750-32:** Airdrop, Parachute Recovery, and Aircraft Personnel Escape Systems
- **CAASOP:** Common Army Airborne SOP (Ed. II)
- **FM 3-99:** Airborne Operations
- **TC 3-21.220:** Static Line Operations
- **TB 43-0002-43:** Maintenance Expenditure Limits for parachutes
- **TM 4-48 (4-48.01 to 4-48.25):** Airdrop Rigging for equipment
- **TM 10-1670 series:** Regulations covering parachute systems
- **SOCOM 350-3:** SOCOM MFF operations
- **USASOC 350-2:** USASOC MFF operations

METL Training AD (Aerial Delivery):

Logon to ATN (<https://atn.army.mil/>); select CATS (OR METL); select component (QM); then search; and then your unit type (BADC, CADC, DPPC, or DADC); then click view selected.

- **4 METL Tasks:** Manage Aerial Delivery Supplies (10-CO-0010); Conduct BDE/DIV/CORP Aerial Delivery Support CO Operations (10-CO-2330/2830/4330); Conduct Expeditionary Deployment Operations (55-CO-4830); Conduct Unit Defense (63-CO-0727).

When you take over/begin your AD journey:

- Understand every piece of equipment on your property, what portion of that equipment is “accounted for/SI/expendable/nonexpendable/etc.”

- **Ensure 100% accountability of all equipment (and parachutes) prior to, & after, each jump.**
- Know MTOE vs CTA equipment (ex: sewing machines) and how to resource them (FMS Web).
- Understand your capabilities (how many systems can dry/shake out at once, drying time per parachutes, max pack capability, repair capabilities/limitations, etc.).

CHAPTER 2 DUTIES AND RESPONSIBILITIES

Airdrop Systems Technician – MOS 921A (WO1/CW2)

- Informing Commander on pertinent information relating to airdrop
- Advisor to CDR IRT packing, safety, advisory (maintenance) messages, and technical issues
- Trains and certifies all malfunction officers IAW AR 59-4
- Certifies in-processors (IPs) and packers IAW AR 750-32
- Ensures all riggers are trained and capable on all shop equipment IAW the appropriate manuals
- Validates all packer certifications (annual requirement)
- Advises and implements quality control (QC) methods and maintains all copies of QC
- Responsible for submitting all reports (monthly parachute summary, etc.)
- Ensures all standard operating procedures (SOPs), technical manuals (TMs), and field manuals (FMs) are followed

First Sergeant

- Responsible for the health, morale, and welfare of Soldiers assigned to the company.
- Works with Platoon Sergeant and Shop Foreman to ensure they meet training & admin requirements.
- Works with Commander to ensure Battalion adds Company training events to Battalion calendar.
- Understands all implied tasks associated with accomplishing training and mission requirements.
- Provides proper guidance, expertise, and wisdom to Company NCOs and Soldiers.

Platoon Leader

- Liaison between rigger platoon, Command, and Battalion leadership.
- Responsible for balancing shop requirements, company requirements, and 350-1 training.
- Works with the Platoon Sergeant to execute Company training and meeting Battalion missions.
- Works with Airdrop Technician and Shop Foreman to project Parachute Forecasts (**min: 90 days out**).
- Provides oversight for packing operations.
- Establishes QC methods with Company Commander and Airdrop Technician.
- Ensures all SOPs, TMs, and FMs are followed.

Platoon Sergeant

- The Platoon Leaders battle buddy! Focus on establishing a good foundational relationship.
- Responsible for the health, morale, and welfare of Soldiers assigned to his/her platoon.
- Works with the Shop Foreman to balance the training calendar and pack cycles.
- Advises 1SG on platoon operations & ensures all Company training and administrative requirements are complete.

- Understands all implied tasks associated with accomplishing training and mission requirements.
- Provides proper guidance, expertise, and wisdom to his/her platoon leader(s).

Shop Foreman

- A certified Packer and IP, E-6 or above.
- Must be qualified on all parachute systems being packed (MC6, RA1, T-11, etc.).
- Serves as the principle advisor to Airdrop Technician concerning packing, safety, & technical issues.
- Balances pack/cargo parachute mission with PSG to accomplish missions outside the pack facility.
- Serves as the QC monitor for all the work conducted in the Section.
- Advises Airdrop Systems Technician on packing operations & serves as Shop Technician in their absence.

Final Inspector (FI)

- A certified Packer and IP, E-5 or above, responsible for up to eight pack lanes, conducts a routine inspection IAW appropriate TM of each packed parachute.
- Ensures Parachute Log Record Books are filled correctly, signed by Packer & IP, & placed in stow pocket.
- Initiates the routine inspection block for every parachute inspected IAW the appropriate TM.

In-processor (IP) Inspector

- Certified Packer, E-5 or above, responsible for verifying rigger checks for packers (recommend 3) IAW AR 750-32.
- IPs will not assist Packers at any time with Packer responsibilities (i.e. folding gores).
- IPs may layout parachutes and stow static lines if it does not interfere with IP duties.
- Ensures recorded serial & D-Bag numbers are correct on paper work & Parachute Log Record Book.
- Ensures equipment is within its service life and conducts physical inspection of each respective Packers packing aids.

CHAPTER 3 TYPES AND METHODS OF AIRDROP

TYPES OF AIRDROP

Free Drop (FD): Often preferred for humanitarian daily rations (HDR) and non-fragile items. The load descends at a rate of 130 to 150 feet per second. Baled clothing, fortification, and barrier materials are other examples of non-fragile items that can be free dropped successfully.

High-Velocity (HV): used when threat conditions dictate that the aircraft remain at high altitudes to avoid hostile air defenses but, for accuracy, drift must be minimized. Class I, Class III (P), and Class V are the most probable candidates for this type of delivery.

Low-Velocity (LV): used for all supplies and equipment. Desired rate of descent is no more than 28 feet per second. Vehicles and Class IX major assemblies are delivered using this method.

METHODS OF AIRDROP

Extraction Method: The extraction method uses an extraction parachute to pull the load out of the rear of the aircraft cargo compartment. It is used for almost all large low-velocity loads, such as vehicles, containers, and pallets. Type V platforms are extracted from the aircraft.



Gravity Method: Aircraft climbs altitude, raises the nose of the aircraft, and, once they reach the desired release point, they cut the webbing or the release the locks and the containers or platforms exit. This method primarily drops Container Delivery Systems (CDS) at either LV or HV type loads.

Door Method: Involves supplies exiting from either (or both) doors of the aircraft. Normally configured for class I, in an A7A or A21 bundle, within 80-400 lbs., and at HV or LV.

CONTAINER LOADS – (Refer to TM 4-48.03 for specifics on each load)

CONTAINER DELIVERY SYSTEMS (CDS) (Chapter 3-8) – Loads rigged in airdrop containers (A-7A, A-21, or A-22). These containers usually airdrop small items, ready-to-use or disassembled equipment, or other non-fragile supplies and should be padded with felt, cellulose wadding, or honeycomb.

A-7A CONTAINER LOADS (Chapter 3-4) – HV or LV; door or ramp; (Table 3-1 for parachute requirements with min/max weight capabilities).

A-21 CARGO BAG (Chapter 5) – Same capabilities and requirements as A-7A Container except higher weight capacity and different parachutes (Table 5-1 for parachute requirements with min/max weight capabilities).

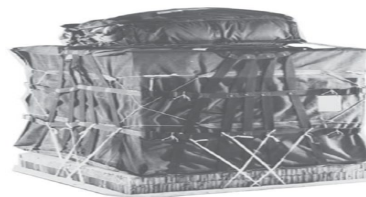
A-22 CARGO BAG (Chapter 7-8) – Similar to A-21 Cargo Bag except higher weight capacity, ramp exit only, and different parachutes (Table 5-1 for parachute requirements with min/max weight capabilities).

RIGGED LOAD DATA

Parachute

Weight: Minimum load allowed	501 lbs.
Maximum load allowed	2,200 lbs.
Height:	83 in. (101 in. for C17)
Width:	43-48 in.
Length:	48 in.


A22 with a G-12E



LOW-COST AERIAL DELIVERY SYSTEM (LCADS), LOW COST CONTAINER (LCC) (Chapter 11-12)

A simplified, low cost alternative to the A-22. Used for high volume delivery of supply items when recovery of AD equipment is impractical or disruptive to retrograde operations. It is designed as a onetime use expendable item. The LCADS can utilize the LCADS High Velocity Cargo Parachute (HVCP), LCADS Low Velocity Cargo Parachute (LVCP) the 26ft High Velocity Cargo Parachute (HV alternate) or the G-12E Cargo Parachute (LV alternate).

RIGGED LOAD DATA

	LV	HV	<i>LCADS with G-12E Parachute</i>
Weight: Minimum load allowed	501 lbs.	900 lbs.	
Maximum load allowed	2,200 lbs.	2,200 lbs.	
Height:	83 in.	83 in.	
Width:	48 in.	48 in.	
Length:	48 in.	48 in.	

LOW COST LOW ALTITUDE (LCLA) LOADS (Chapter 13-14)

The system is an expendable type, one time use item, which is user friendly (easy to rig, transport, and deliver). Typical loads are rigged for LCLA airdrop from the ramp or door of an aircraft. The drop altitude of the LCLA is from 150 ft. AGL to 350 ft. AGL. LCLA parachutes are the LCLA 35' diameter cargo parachute, the LCLA 24' diameter cargo parachute, and the cross or triple cross parachute. The weight range for the resupply load is 80 lbs. to 450 lbs. To conduct LCLA operations, the personnel must be a jumpmaster, a parachute rigger, or Quartermaster Center and School LCLA trained and certified.

RIGGED LOAD DATA

	Cross	Double	Triple
Weight: Minimum load allowed	93 lbs.	201 lbs.	401 lbs.
Maximum load allowed	213 lbs.	426 lbs.	640 lbs.
Height:	37 in.	48 ¾ in.	64 ¼ in.
Width:	24 in.	42 in.	48 in.
Length:	18 in.	24 in.	36 in.

LCLA rigged with Cross Parachute



JOINT PRECISION AIRDROP SYSTEMS (JPADS) (Chapter 15)

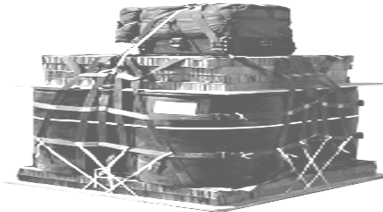
JPADS uses global positioning and interfaces with a Mission Planning Module on board the aircraft to receive real-time weather data and compute aerial release points. The JPADS Modular Autonomous Guidance Unit (MAGU) is equipped with a removable MIL-GPS unit. Upon

completion of an airdrop mission, the MIL-GPS module arms the self-destruct feature, called Recovery Mission Duration Zeroization (RMDZ) for itself and the AGU to prevent its use by the enemy. These features must be disarmed within 45 days of activation to avoid the self-destruct feature.

RIGGED LOAD DATA

	2K	10K
Weight: Minimum load allowed	880 lbs.	2,281 lbs.
Maximum load allowed	2,281 lbs.	10,000 lbs.
Height:	83 in.	83 in.
Width:	48 in.	83 in.
Length:	48 in.	83 in.

***CDS rigged with
JPADS 2K system***



PLATFORMS

LV airdrop missions for fragile equipment (ex: vehicles).

Dimensions of the platform used and the capabilities for each platform (weight of load per aircraft) are listed here.

The Dual Row Airdrop System: C17 only.
Places platforms side by side to increase quantity of platforms exiting at one time.

Platforms				
Length (ft)	Width (in)	Min Weight (lbs)	C-130 Max Weight (lbs)	C-17 Max Weight (lbs)
8	108	2,520	15,000	10,000
12	108	3,780	21,000	18,500
16	108	5,040	28,000	28,000
20	108	6,300	39,000	39,000
24	108	7,560	42,000	42,000
28	108	8,820	42,000	42,000
32	108	10,080	42,000	42,000
Dual Row Airdrop System (DRAS)				
18	88	7,500	N/A	14,500
18	88	7,500	N/A	14,500

CHAPTER 4 PARACHUTES CAPABILITIES

COMMON PERSONNEL PARACHUTES:

T-11 Main Parachute

Rate of descent: 19 fps.
Rigged weight: 37 lbs.
Pack Quota: 15 T-11Ms
Pack life: 182 days
Shelf Life: 7 yrs.
Service Life: 12 yrs.
Total Life: 19 yrs.



T-11 Reserve Parachute

Rate of descent: 26 fps
Rigged weight: 15 lbs.
Pack Quota: 15 T-11Rs
Pack Life: 365 days.
Shelf Life: 7 yrs.
Service Life: 12 yrs.
Total Life: 19 yrs.

MC-6 Parachute

Rate of descent: 19 fps.
Rigged weight: 26 lbs.
Pack Quota: 25 MC-6s
Pack Life: 182 days.
Shelf Life: 7 yrs.
Service Life: 14 yrs.
Total Life: 21 yrs.



RA-1 Parachute

Rate of descent: 8.5 fps.
Rigged weight: 19 lbs.
Glide Ratio: 4:1
Pack Life: 179 days.
Shelf Life: 7 yrs.
Service Life: 14 yrs.
Total Life: 19 yrs.

Note: Parachute Components (Riser Assembly, Pack Tray, etc.) have different lives than the parachute itself (allowing you to still use these components even if the parachute falls out of service life).

COMMON CARGO PARACHUTES

68" Pilot Parachute: For door bundles. 1-3 parachutes per load and dropped HV or LV.

T-10 Cargo Parachute: A T-10 converted for cargo. Once used for cargo at LV; NEVER use again for personnel.

26' HV Parachute: For CDS at HV.

Cross Parachute: Primarily for LCLA. HV or LV, door or ramp, 1-3 parachutes.

G-11 Cargo Parachute: For LV platform AD. 1-8 parachutes per load (extract only).

G-12 Cargo Parachute: Primarily CDS at LV.

G-14 Cargo Parachute: Primarily door bundles or CDS. Used with 1-3 parachutes per load and dropped HV or LV.

G-15 Cargo Parachute: Primarily CDS (extract only).

G-16 Cargo Parachute: For LV platform AD. 1-8 parachutes per load (extract only).

SUSPENDED WEIGHT (LBS) (w/out parachute)			
PARACHUTE	MINIMUM WEIGHT	MAXIMUM WEIGHT	MINIMUM DROP ALTITUDE (feet AGL)
HIGH VELOCITY (HV)			
1 x 68" PILOT	75	150	None
3 x 68" PILOT	151	500	None
12-ft HV	151	500	400
15-ft EXT	151	500	400
26-ft HV	501	2,200	500
22-ft EXT	501	2,200	500
Medium VELOCITY (MV)			
G-15			
GRAVITY	501	2,200	400
EXTRACTION	1,000	2,000	400
LOW VELOCITY (LV)			
1 x 68" PILOT	30	50	None
3 x 68" PILOT	51	200	None
T-10 Mod Cargo	90	500	400
G-16			
1 - 4	2,500	22,000	750
5 - 8	22,001	42,000	975
G-14			
1	200	500	300
2	501	1,000	300
3	1,001	1,500	400
G-12E			
1	501	2,200	475
2	2,270	4,000	550
G-11B			
1	2,270	5,000	900
2	5,001	10,000	1,100
3	10,001	15,000	1,100
4	15,001	20,000	1,100
G-11C			
5	20,001	25,000	1,100
6	25,001	30,000	1,100
7	30,001	35,000	1,100
8	35,001	40,000	1,300
LCLA			
LCLV	501	2,200	850
Cross	80	200	350
Double Cross	201	400	350
JPADS (RAM AIR CARGO)			
2K MAGU	700	2,150	3,500 TRN, 5,000 OPER.
10K	4,500	9,500	3,500 TRN (Extrac Only), 5,000 OPER. (Extract or Grav)

Note: Cargo Parachutes: Pack Life (generally 2 years).

CHAPTER 5 REQUIREMENTS FOR AIRDROP SUPPORT

TC 3-21-220 STATIC LINE PARACHUTING TECHNIQUES AND TACTICS is the key manual which will guide a unit through the requirements needed to conduct an airborne operations.

Air Letter

Official notice and approval for the airborne operation. Normally G3/5/7/9 Airborne Operations/S3 Air channels publish an Air Letter. This letter lists Army and Air Force units involved, weather decision time, load time, station time, takeoff time, objective time and the DZ. It will state if missions are Engine-Running On-Load (ERO), etc. Air letter provides additional information such as number of parachutes by type, and which aircraft are designated for HD, CDS, etc. All changes to the Air Letter, regarding rigging requirements, must be requested the week prior to the week of the operation.

Joint Airdrop Inspection (JAI)

JAI certification: successful completion of USAQMC&S resident or mobile training team Airdrop Load Inspector Certification Course (ALICC) presented by the ADFSD at Fort Lee, VA.

The JAI is performed for each cargo airdrop and is conducted by one certified individual from each service involved. Prior to airdrop, loads or containers rigged for airdrop will be inspected three times separately. No airdrop load (to include nonstandard and free-drop) will be accepted unless rigged IAW specific FMs/TOs distributed by USAQMC&S, ADFSD, or the Joint Special Operations Command. The Air Force loadmaster/JAI has the final call on accepting the cargo for aerial delivery. Waivers for nonstandard airdrop loads dropped from AF aircraft are submitted to HQ AMC/A3DT through the applicable Army ACOM/ASCC/DRU or Air Force MAJCOM.

Recovery Responsibilities

Most damage to airdrop equipment and supplies occurs during derigging and recovery. Riggers are not responsible for recovery. The responsibilities are described below.

RECOVERY OIC OR NCOIC: The recovery OIC or NCOIC is responsible for planning and supervising the Recovery Operation. They supervise the teams needed to recover and evacuate all airdrop/JPADS rigging and parachute equipment. They are responsible for understanding all recovery requirements.

THE RECEIVING UNIT: The receiving unit (or unit identified for recovery) must be capable of conducting airdrop recovery and storing equipment, if needed. The receiving unit is responsible for returning all airdrop equipment in proper condition. The unit are accountable for damage to airdrop equipment if found negligent or fail to follow the procedures.

Airdrop Platform Load Derigging Procedures:

Derigging procedures consist primarily of removing the basic components of the rigging equipment from the load so that the airdrop items may be moved quickly from the drop zone and put into use. A parachute rigger must train receiving units on proper derigging procedures before the airborne operation.

CHAPTER 6 SLINGLOAD & ROTARY WING SUPPORT

Refer to **TM 10-1670-295-13&P** and **TM 4-48.09** for sling load equipment and operations.

Training

To perform Sling Load Operations, personnel must be Sling Load Inspection Certification Course (SLICC) qualified. To earn this certification, personnel are trained by a Mobile Training Team (MTT) or from one of the following resident locations: Sling Load Inspection Certification Course (Fort Lee, VA); Air Assault (Fort Campbell, KY) or Pathfinder (Fort Benning, GA).

Types of Sling Load Methods:

Single-Point Loads: One load rigged and one aircraft cargo hook used during flight (**TM 4-48.10**).

Dual-Point Loads: One load rigged and two aircraft cargo hooks used during flight (**TM 4-48.11**).

Tandem Loads: Two loads rigged, one in front of the other, & two aircraft cargo hooks used during flight.

Side-by-Side (Shotgun) Loads: Two loads rigged, one beside the other, & one or two aircraft cargo hooks used during flight.

Aircraft AD Capabilities (Army)

UH-60 (Blackhawk) – Deliver supplies internally (door loads) or externally (cargo hooks). A-7A/A-21 (Max 500 lbs.) and LCLA (450 lbs.), both dimensions: 48 in. (L), 30 in. (W), & 42 in (H).

CH-47 (Chinook) – deliver supplies over ramp. Any CDS bundle or LCLA can be dropped IAW with their normal weight allowances.

C-23 (Sherpa) – deliver supplies over ramp only. Any CDS bundle or LCLA can be dropped IAW with their normal weight allowances. Height of bundle is restricted to 55 in.

CasA-212 – deliver supplies over ramp only. Any CDS bundle or LCLA can be dropped IAW with their normal weight allowances. Height of bundle is restricted to 65 in.

Aircraft AD Capabilities (Marines)

KC-130 – same capabilities as an Air Force C-130 (H) aircraft.

CH-53 (Sea Stallion) – Deliver supplies over ramp. Internal Rollers are limited to 2,200 lbs. on a 48 in. skid board. Max dimensions include: 73 in. (H), 76 in. (W) and only 336 in cabin space (total).

CH-46 (Sea Knight) – deliver supplies over ramp and has the same AD capabilities as the CH-53. LCADS LCC dropped with LV parachute only and LCLA dropped with cross parachute only.

CHAPTER 7 MALFUNCTIONS

Malfunction Officer (MO)

MO website - <https://www.milsuite.mil/book/groups/airdrop-manual-malfuctions-office>

MO Training website – <https://nemesis.jten.mil/Atlas2/page/login/Login.jsf>

Malfunction Officer (MO) duties are outlined in (AR 59-4). An MO will be a commissioned officer, warrant officer, or NCO (min. grade of E-5) from the parachute issue facility. The MO will be a USAQMC&S trained parachute rigger (MOS 92R, 921A, R9) and must be technically proficient with the airdrop systems used on that operation. Individuals will be retrained and recertified annually. Training/certification records will be maintained on file at the unit level.

Exception: The MO qualifications may be waived to an MOS 92R1P (E-4 only) when recommended by the parachute rigger warrant officer (MOS 921A) in charge of that organization or other authorized unit supervisors IAW AR 750-32, paragraph 2-8d, & approved by the first 0-5 in the chain. Qualified and authorized E-4 MOs will be limited to single ship missions only. Army National Guard & Army Reserve personnel meeting the above requirements are considered qualified MOs as civilian technicians.

MO training requirement per Operation type

a. Static line personnel parachutes, not including Ram Air Personnel Parachute Systems (RAPPS)

- | | |
|---|------------------------------|
| (1) Pack-in-process inspector certified | (2) MO trained and certified |
|---|------------------------------|

b. Ram Air Personnel Parachute Systems (to include static line deployed RAPPS if applicable)

- | | |
|---|------------------------------|
| (1) Pack-in-process inspector certified | (2) MO trained and certified |
|---|------------------------------|

c. Ram air cargo (RAC) airdrop (precision airdrop)

- | | |
|---|---------------------------------|
| (1) Pack-in-process inspector certified | (2) MO trained and certified |
| (3) RAC trained & certified (if applicable) | (4) RAC air trained & certified |

d. Cargo airdrop

- | | |
|--|----------------------------|
| (1) JAI trained & certified (not for door bundles) | (2) MO trained & certified |
|--|----------------------------|

Pulling Malfunction Duties

The MO will be present on the DZ during all personnel and equipment drops and will be knowledgeable with the requirements contained in AR 59-4. The MO will possess the following equipment while performing MO duties:

- | | |
|--|----------------------------|
| a. A communication capability provided by the DZ control party | b. Photographic equipment. |
| c. Binoculars and/or night-vision devices as applicable. | d. All necessary forms |
| e. A dedicated (4-wheel drive capable) vehicle to move around DZ | f. An approved wind meter |
| g. MO investigation guide* | h. Current DZ survey |

MO investigation guide is not required by regulation. HOWEVER, to guarantee MOs will act quickly and accordingly during an serious incident; an MO book with Chapter 4 from AR 59-4

printed out, all POCs (to include the police, fire department, and medical evacuation personnel assigned to that drop zone), and any other pertinent information. During an investigation, medical always takes priority.

If a malfunction occurs, MOs complete the appropriate DD Form 1748 & submit through the airdrop manual and malfunction board (the MO website listed above).

DD Form 1748s and submission process:

DD Form 1748-2 (Personnel and/or Equipment) is required anytime an airborne operation has a malfunction involving the appropriate operation. The DD Form 1748-3 is a required monthly airdrop summary report used to compile data, from your unit, on airborne operations from the previous month.

Download the appropriate forms (via the links below):

1748-2 JOINT AIRDROP MALFUNCTION REPORT (PERSONNEL)

https://army.deps.mil/Army/CMDS/CASCOM_QM/ADFSD/ADMMO/Lists/17482PersonnelStaticLineReport/Item/newifs.aspx?Source=https%3A%2F%2FARMY%2Edeps%2Emil%2FARMY%2FCMDS%2FCASCOM%5FQM%2FADFSD%2FADMMO%2FLISTS%2F17482PersonnelStaticLineReport%2F165th%2520MRB%2520JUN21%2Easpx&RootFolder=

1748-2 JOINT AIRDROP MALFUNCTION REPORT (CARGO)

https://army.deps.mil/Army/CMDS/CASCOM_QM/ADFSD/ADMMO/Lists/17482EquipmentReport/Item/newifs.aspx?Source=https%3A%2F%2FARMY%2Edeps%2Emil%2FARMY%2FCMDS%2FCASCOM%5FQM%2FADFSD%2FADMMO%2FLISTS%2F17482EquipmentReport%2F165th%2520MRB%2520JUN21%2Easpx&RootFolder=

1748-3 MONTHLY AIRDROP SUMMARY

https://army.deps.mil/Army/CMDS/CASCOM_QM/ADFSD/ADMMO/Lists/DD%2017483%20New/165th%20MRB%20JUN21.aspx

You can also download the forms (via the links below):

<https://armypubs.army.mil/>

<https://www.esd.whs.mil/Directives/forms/>

https://www.esd.whs.mil/Directives/forms/dd1500_1999/

To Submit 1748 series forms (select forms):

Open the SharePoint "ADM/MO Public" Dashboard page and follow the instructions:

https://army.deps.mil/Army/CMDS/CASCOM_QM/ADFSD/ADMMO/default.aspx

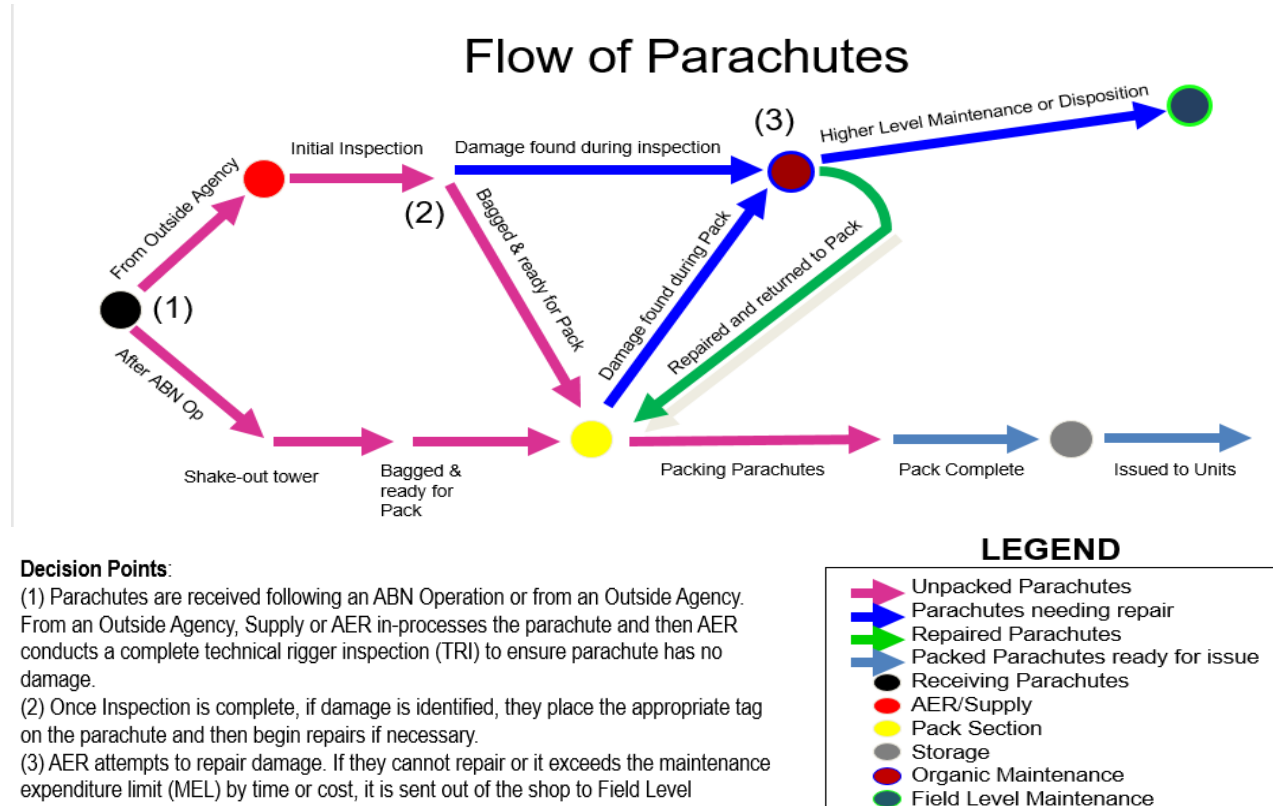
Note: These reports are used to determine trends across the airborne community (packing numbers per malfunction, number and type of incidents per quarter, number of injuries per airborne operation, etc.).

CHAPTER 8 MAINTENANCE

Top Maintenance Concerns:

- 1) All Riggers aren't equal in sewing proficiency. Don't estimate hours solely based on "projected hours"
- 2) How to operate all the sewing machines (zig zag, bar tack, light, medium, heavy & double needle)
- 3) Conducting weekly PMCS on sewing machines and maintain enough supplies
- 4) Training Soldiers: maintenance repair and sewing machine repair school (Naval School in Pensacola, Florida; RAM parachute repair at Fort Bragg, NC; etc.)
- 5) Understanding how to do user-level repair and the process for repairing oxygen equipment for free fall
- 6) 2 different levels of maintenance: *low-hour* (fast repair/turn around) and *high-hour* (severely damaged chutes but not beyond economical repair {BER})

Below is the Flow of Parachutes from reception, through airborne operation until disposition.



Maintenance Allocation Charts (MAC): These explain how much time/repair can be performed on parachutes. Supply begins disposition process if a parachute exceeds either category.

T-11R	Service YRS remaining	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	Maint hrs allowed	56	56	56	50	46	41	37	32	28	23	18	14	9	5
	Repair Limit (%)	96	88	80	72	64	56	48	40	32	24	16	12	8	4
T-11M	Service YRS remaining	12	11	10	9	8	7	6	5	4	3	2	1		
	Maint hrs allowed	47	44	40	36	32	28	24	20	10	12	8	4		
	Repair Limit (%)	96	88	80	72	64	56	48	40	32	24	16	8		
MC-6	Service YRS remaining	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	Maint hrs allowed	56	56	56	50	46	41	37	32	28	23	18	14	9	5
	Repair Limit (%)	96	88	80	72	64	56	48	40	32	24	16	12	8	4
RA-1*	Service YRS remaining	12	11	10	9	8	7	6	5	4	3	2	1		
	Maint hrs allowed	47	44	40	36	32	28	24	20	10	12	8	4		
	Repair Limit (%)	96	88	80	72	64	56	48	40	32	24	16	8		
G-11 / G-12	Service YRS remaining	1 to 5	6 to 11	12 to 17	18 to 23	24 to 29	30 to 35	36+							
	Maint hrs allowed	47	44	40	36	32	28	24							

Note: Maintenance Hours are cumulative. If 9 hours are used to repair an MC-6, that parachute system will no longer be usable with 2 service years remaining.

CHAPTER 9 JOINT FORCIBLE ENTRIES (JFE)

Joint Forcible Entries (JFEs) are the culminating event for airborne forces. IOT support JFEs, aerial delivery officers need to understand the JFE concept and each unit's role in execution.

JFE 5 Phase Construct:

Phase I: Preparation and Deployment:

Personnel are notified and the out load process of personnel and equipment begins. Heavy Drop Rigging occurs during this phase. Understanding your unit's assembly line rigging capabilities and requirements, to include aerial delivery equipment (ADE) and rigging detail from supporting units, are extremely important to be successful (recommendation: ATP 4-48 and a detailed continuity book for execution during this phase).

Phase II: Assault:

Pre-assault Fires sets conditions for airborne assault forces. Then, maneuver units conduct airborne operations (Alpha Echelon) and begin seizing OBJs to allow engineers to begin FLS repair and prepare for airland.

Phase III: Stabilization of the Lodgment:

Airland (B Echelon) begins. If available, ADE will retrograde from drop zone (through the aircrafts) back to home station (or ISB) to continue rigging resupplies (CDS, 8ft mass platforms, etc.).

Phase IV: Introduction of Follow-On Forces:

Air Lands continue and Follow on Forces (Charlie Echelon) begin.

Phase V: Termination or Transition Operations:

Transfer of responsibility (to incoming unit) and transition to follow-on mission.

JFE Units & Roles:

Team Assault (IN BN): Decisive Operation (DO). Attacks in zone NLT P+0:30 to seize/secure key facilities.

Team Isolate (IN BN): Shaping Operation (SO). Seize OBJs to isolate airhead and prevent enemy from placing direct or indirect fires.

Team Clear (EN): SO. Clear FLS and AO of obstacles.

Team Fires (FA BN): SO. Provide indirect and counter-fire support.

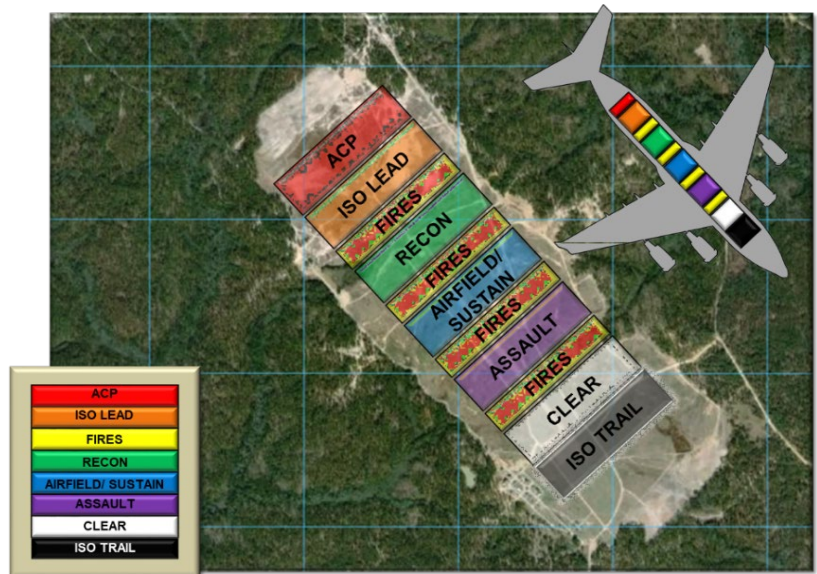
Team Airfield (EN BN): SO. Receive airland aircraft and repair FLS.

Team Sustain (BSB): SO. Provide limited resupply and medical support.

Team Recon (CAV BN): (SO). Conduct screening operations.

Assembly Line Rigging (ATP 4-48):

Establish an SOP (this ensures everyone Understand facility capabilities:



How many assembly lanes your facility can operate at one time?

Number of rollers, cranes, and lifts within the facility.

How many platforms are available (by size, to include DRAS)?

Emplace booths (at each station) that are stocked with the required material for that station

This reduces “sharing” material between stations and speeds up rigging timeline

How many personnel are needed from supporting units for rigging?

Riggers provide supervision of rigging because there aren't enough riggers to solely rely on them to rig up the equipment.

KEY NOTES

Advisory Messages: <https://tulsa.tacom.army.mil/>

- Allows users to find any advisory message pushed out on a piece of equipment (ex: updates on maintenance expenditure limits on T-11 M parachute, new modifications, etc.).
- Includes all advisory messages (MIM, MAM, SOUM, etc).

Quality Control (QC): One of the most important impacts a CDR/PL has on their formation.

Purpose of QC is to ensure parachutes are packed IAW proper regulations & to enforce a Zero Tolerance Policy.

- Rigger Checks (RC) –PLs, Foreman, & Tech need to ensure IPs conduct a RC properly and NOT from the end of the pack table.
- Supervision Skills – Leadership needs to be present on the pack/parachute floor.
- UA Testing – Enforce multiple UAs a month (don't always pick the same day/week because complacency in UA dates = predictability for SMs.
- Random Sampling – Either popping parachutes or having packers jump a selected parachute they pack. Again, do not get complacent (i.e.; always selecting the last parachute they pack or right after lunch).
- Rewards – Whether for QTY of Packing/IP parachutes per month, pulling a certain amount of duties, or 3-4 day weekends; understand what motivates your Riggers and take care of them!!
- Pack-N-Go – A good method for a reward. However, Riggers who pack for speed sometimes make mistakes and you don't want to consistently give young SMs a lot of time off.

Transporting Parachutes: (Includes transportation capabilities and equipment weights)

463L Pallets:

-96 x T11M Packed
-100 x T11M Unpacked (38lbs)
-240 x T11R Packed (14.8lbs)
-64 x T11 Systems (T11M & T11R) (53lbs)

Material Required:

-1 x 463L Pallet
-4 x Sheets Plywood 8'x4'x1"
-2 x Studs 12'x2"x4"
-1 x 1b2.5" nails
-1 x Top Net
-2 x Side Net
-2 x EDM
-Plastic (Sheet or Pallet Cover)
-3 x Rolls, 100 MPH Tape
-Applicable Tools Pallet Construction)

Material Weights:

-463L Pallet: 290lbs
-T11M: 38lbs
-T11R Packed: 14.8lbs

ISU90:

-168 x T11M Packed
-150 x T11 M Unpacked
-264 x T11R Packed

Material Required:

-1 x ISU 90
-2 x Sheets of EDM
-Plastic (Sheet or Pallet Cover)
-3 x Rolls, 100 MPH Tape

Material Weights:

-ISU 90: 1,720 (TARE); 10,000 (Net);
14,900 (Gross)
-T11M: 38lbs
-T11R: 14.8lbs
-Sheet of EDM: 3lbs
-Roll of Plastic: 25.52lbs

20' Reefer:

-320 x T11M Packed
-210 x T11M Unpacked

TRICON:

-114 x T11M Packed
-100 x T11 M Unpacked
-180 x T11R Packed
-80 x T11 Systems
o (T11M & T11R with
40 x MAWC in Between)

Material Required:

2 x Sheets of EDM
Plastic (Sheet or Pallet
Cover)
3 x Rolls, 100 MPH Tape

Material Weights:

TRICON: 2,986 (TARE);
10,000 (Net); 14,900
(Gross)
T11M: 38lbs
T11R: 14.8lbs
Sheet of EDM: 3lbs
Roll of Plastic: 25.52lbs

- Plywood Sheet: 75lbs
- 12'x2"x4" Stud: 8lbs
- Nails: 1lb
- Top Net: 15lbs
- Side Net: 25lbs
- Roll of Plastic: 25.52lbs
- Sheet of EDM: 3lbs

-384 x T11R Packed

Note: 20' Reefer used to keep the parachutes frozen (after becoming wet) to extend the amount of time needed before getting them hung up and dried).

Note: Live Parachutes must be transported under double lock and key IAW AR 190-51.

Note: Parachute that become damp must be hung and begin drying NLT 24 hours from when they became wet to avoid mold.

GLOSSARY & TERMS

ACP – Assault Command Post. A small command and control element, which is normally used to control operations during the initial airborne assault. Sometimes split at Lead (ACP 1) & Trail Edge (ACP 2).

AD – Aerial Delivery

A/DACG – Arrival/Departure Airfield Control Group. Mission command node (Army) that controls the flow of follow in forces onto the airhead.

ADER – Aerial Delivery Equipment Repair (parachute maintenance section).

Airhead – A designated area in a hostile or threatened territory which, when seized and held, ensures the continuous air landing of troops and materiel and provides the maneuver space.

APOD – Aerial Port of Debarkation. Airfield where SMs & materiel are discharged from aircraft.

APOE – Aerial Port of Embarkation. Location aircraft depart to conduct JFE. Can include both a Strategic Deployment from home station or deployment from an Intermediate Staging Base.

ATLS – Advanced Trauma Life Support. Alpha Echelon medical element. Can treat up to four patients and stabilize for CASEVAC. 1x PA with 8x medics.

BADC – Brigade Aerial Delivery Company

Bump Plan – Describes, in detail, individuals and/or equipment in each load or chalk that has priority over others. A bump plan is used to re-allocate personnel and equipment if aircraft become unavailable.

CADC – Corps Aerial Delivery Company

DADC – Division Aerial Delivery Company

D-Day – The unnamed day on which a particular operation commences or is to commence.

DPPC – Division Personnel Pack Company

DZSO – Drop Zone Safety Officer

EDM – Energy Dissipating Material (Honeycomb); material used to absorb impact upon hitting ground.

ERO – Engine-Running On-Load/Offload; Loading/unloading an aircraft while engines are still on.

FLS – Field Landing Strip. A runway capable of receiving air lands.

ILAR – Integrated Logistics Aerial Resupply.

Initial Entry Forces (Alpha Echelon) – All personnel & equipment that will be airdropped during an AFS.

Intermediate Staging Base (ISB) – A temporary location used to stage forces prior to inserting them onto the objective. ISB is established near to, but not in, the area of operations.

LARP – Light Airfield Repair Package. Conducts hasty repairs on runways to enable & sustain airland ops.

LLE, RLE – (L/R) Lead Edge. The edge of the drop zone aircraft approach from.

Load Time – Time identified in Jumpmaster timeline to have paratroopers seated and ready for departure.

Lodgment Area – An airhead or beachhead in a hostile or threatened area which, when secured, permits the delivery of forces and supplies, and provides maneuver space.

LTE, RTE – (L/R) Trail Edge. The edge of the drop zone aircraft depart.

LVADS – Low Velocity Airdrop Systems (platforms)

MAM – Maintenance Action Message. Requires action on maintenance to a parachute system or process.

MIM – Maintenance Information Message. Provides updates on changes to parachute system or process.

Minimum Forces (Min Force) – Smallest number of personnel & equipment required for a mission/OBJ.

MOG – Maximum (aircraft) on Ground. Maximum number of aircraft an airfield can accommodate.

MOS – Minimum Operating Strip. Minimum dimensions of FLS required to safely land specified aircraft.

MRB – Malfunction Review Board. Triannual meeting to discuss changes in airborne community and any incidents that occurred via static line, free fall, or heavy drop (AD).

N-Hour – Time a unit is notified to assemble its personnel and began the deployment sequence.

Pack life – Begins when parachute is packed, inspected, and certified. Pack life resets when the parachute is jumped or after it is repacked.

P-Hour – When the first paratrooper exits the aircraft.

Service life – Begins when a parachute is put into cycle (receives a technical inspection and is packed).

Shelf life – Begins when parachute is manufactured. Parachutes can't be used after shelf life expiration.

SOUM – Safety of Use Message; defect found (in specific equipment or process) that can lead to harm or danger and requires immediate action.

Station Time – Time identified, in airborne timeline, when the aircraft departs the departure airfield.

LINKS

ADFSD One Stop Page: <https://cascom.tradoc.army.mil/sites/qm/ADFSD/SitePages/Home.aspx>

ADFSD Blackboard:

https://almc.ellc.learn.army.mil/webapps/blackboard/execute/announcement?method=search&context=course_entry&course_id=_18147_1&handle=announcements_entry&mode=view

MilSuite Pages:

<https://www.milsuite.mil/book/groups/airdrop-malfunction-and-safety-analysis-review-board>

<https://www.milsuite.mil/book/groups/abn-flash-report>

<https://www.milsuite.mil/book/groups/921a-airdrop-systems-technicians>

<https://www.milsuite.mil/book/groups/airdrop-manual-malfuctions-office>

<https://www.milsuite.mil/book/groups/static-line-symposium>

<https://www.milsuite.mil/book/groups/paramarine1>

<https://www.milsuite.mil/book/groups/usasoc-imsaag>

<https://www.milsuite.mil/book/groups/af-liaison-for-airdrop>

<https://www.milsuite.mil/book/groups/usasoc-aerial-delivery-branch>

https://army.deps.mil/Army/CMDS/CASCOM_QM/ADFSD/ADMMO/default.aspx

<https://www.milsuite.mil/book/community/spaces/sustainnet/quartermastercommunity/aerialdelivery/slingload>

ADFSD Facebook: <https://www.facebook.com/LEEADFSD>

Additional Sling load Page: http://www.quartermaster.army.mil/adfsd/adfsd_sling.html

Safety: <https://tulsa.tacom.army.mil/index.cfm>

Malfunction Course (J3T – Series, A-US1400 – Course #):

<https://nemesi.jten.mil/Atlas2/page/login/Login.jsf>

Packing Different Types of Parachutes: YouTube “Sky Shark __ (the type of parachute) videos”

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RIGGER SMART BOOK



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RESOURCES

- **ELECTRONIC TECHNICAL MANUALS:**
 - <https://liw.logsa.army.mil/etmapp/#/etm/home>
- **ARMY PUBS: (AR, DA PAMS, DA FORMS)**
 - <https://armypubs.army.mil/>
- **AERIAL DELIVERY & FIELD SERVICES DEPARTMENT (ADFSD)**
 - <https://quartermaster.army.mil/adfsd>
- **SHARE POINT- ADMMO DASHBOARD**
 - https://army.deps.mil/Army/CMDS/CASCOM_QM/ADFSD/ADMMO/
- **INSTRUCTIONAL VIDEOS:**
 - <https://www.youtube.com/c/SkyShark92r>
- **SL JUMPMASER:**
 - <https://www.benning.army.mil/infantry/artb/1-507th/Jumpmaster/>
- **MFF JUMPMASER:**
 - <https://www.soc.mil/SWCS/MFFJMC.html>

JOINT AIRDROP INSPECTION RECORDS, MALFUNCTION/ INCIDENT INVESTIGATIONS, AND ACTIVITY REPORTING

AR 59-4

This regulation prescribes policy and identifies procedures and forms used in preparing Joint airdrop inspection records, airdrop malfunction investigations, and airdrop activity reports.

AIRDROP, PARACHUTE RECOVERY, AND AIRCRAFT PERSONNEL ESCAPE SYSTEMS

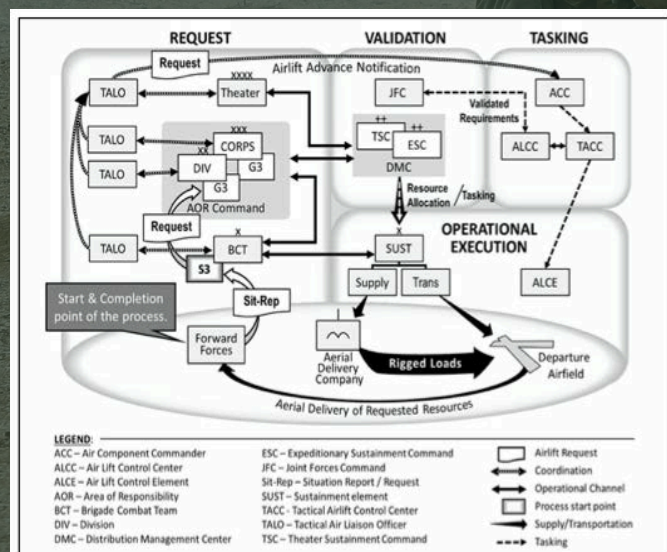
AR 750-32

This regulation establishes and clarifies qualification requirements and designates responsibilities for personnel maintaining and packing parachutes.

AERIAL DELIVERY

ATP 4-48

ATP 4-48, Aerial Delivery, is the United States Army reference for aerial delivery operations. Its purpose is to provide guidance on all aspects of aerial delivery operations. ATP 4-48 expands the discussion of basic aerial delivery introduced in FM 4-40, Quartermaster Operations. This publication defines aerial delivery; discusses aerial delivery methods and options; describes the planning, preparation, execution process; and identifies roles and responsibilities in the conduct of aerial delivery. The intent is to provide the reader with an understanding of the abilities, limitations and techniques of aerial delivery.



STATIC LINE PARACHUTING TECHNIQUES & TRAINING

TC 3-21.220

Provides all Department of Defense Airborne personnel with techniques and training guidelines to maintain an Airborne Force. This Training Circular contains the basic and advanced training and techniques for static line parachuting. It is designed to standardize procedures for initial qualification and training of personnel in their duties and responsibilities in Airborne Operations.

MINIMUM JUMP ALTITUDES

TACTICAL STATUS	AIRCRAFT TYPE	APPLICATION	FEET AGL	
			T-11	MC-6
Peacetime	Fixed wing	Basic Airborne training	1250	N/A
	Fixed wing ¹	Tactical training	800 ¹	800 ¹
	Rotary wing	Aircraft with a drop speed less than 90 knots	1500 ³	1500
	Rotary wing	Aircraft with a drop speed more than 90 knots	1250 ³	1250
Combat (Wartime)	Rotary wing	Aircraft with a drop speed more than 90 knots	600 ³	600
	Fixed wing ²	Aircraft with a drop speed more than 125 knots	550 C-130 525 C-17	475

LEGEND

¹ 800 feet AGL drop altitude may raise the risk level based on jumper's proficiency and command experience.

² Reserve parachute optional.

³ T-11 may be used for rotary-wing operations if justified by a command deliberate risk assessment worksheet. Due to the drift characteristics of the parachute, the jumper may drift off of the surveyed drop zone.

AGL – above ground level; N/A – not applicable

COMMON ARMY AIRBORNE STANDARD OPERATING PROCEDURE (CAASOP)

The Common Army Airborne Standard Operating Procedure (CAASOP) is the Army Airborne Board's (AAB) vehicle to provide the Army's Conventional Airborne Force (CAF) with common procedures for training, qualifying, preparing, planning and executing airborne operations. This document is intended to provide the CAF with a baseline for best practices, while allowing commanders latitude to accomplish their missions.

JUMPERS PER AIRCRAFT

Type of aircraft and TAP configuration	Maximum ACL per TC or USAF Addenda A	Number of T-11 CE Jumpers (Planning/Includes Safeties)
C-130: TAP 1	66	54
C-130: TAP 2 (in-flight rigging)	56	46
C-130: *A TAP 2 (in-flight rigging)	42	42
C-130J-30: TAP 1	92	76
C-130J-30: TAP 1 MOD	79	66
C-130J-30: TAP 2 (in-flight rigging)	82	72
C-17	102	102
C-27J	28	28 (paratroop door only)
UH-60	Eight + JM	Eight + JM
CH-47	24	24

GENERAL MAINTENANCE OF PARACHUTES AND OTHER AIRDROP EQUIPMENT

TM 10-1670-201-23

This technical manual provides guidance on general maintenance requirements to include facility operating procedures, shop layout details, inspection procedures, repair instructions, shipping requirements, and administrative storage.

- **TEMPERATURE IS BETWEEN 50°F AND 95°F WITH OCCASIONAL EXTREMES FROM 40°F TO 120°F.**
- **RELATIVE HUMIDITY IS BETWEEN 25 TO 80%**
- **THERE ARE NO RAPID CHANGES OF TEMPERATURE WHICH WOULD CAUSE MOISTURE CONDENSATION.**
- **EQUIPMENT IS STORED AT LEAST 6" OFF THE FLOOR, 1' AWAY FROM EXTERNAL WALLS AND 4' BELOW THE ROOF OR CEILING. WITH VENTILATION ALLEYS BETWEEN STACKS ON ALL SIDES.**
- **STOCK IS PROTECTED BY COVERS FROM EXPOSURE TO BRIGHT SUNLIGHT AND FROM FLUORESCENT LIGHTING WITHIN 6' DISTANCE.**

SECURITY OF UNCLASSIFIED ARMY RESOURCES

AR 190-51

Provides security standards for air items and airdrop systems, and personnel and cargo parachute systems including associated ancillary items

Personnel items and systems: Provide **double barrier protection** for the items and systems at the custodial rigger facility when not in use and while in training in non-tactical environments as follows:

- **Locked** in a secure storage structure per appendix B.
- **Lock items** and systems in a steel cage, approved container, room, bin, drawers, or cabinets as the required **second barrier** while in a secure storage structure. Extend steel caging, if used, to the ceiling or enclose with a top of like material per appendix B.
- **Signs** will be posted at the activity entrances stating **"Off Limits To Unauthorized Personnel."**
- **Illuminate** the exterior of secure storage structure buildings during the **hours of darkness.**

GENERAL REFERENCES

- AR 190-51: SECURITY OF UNCLASSIFIED ARMY RESOURCES
- AR 59-4: JOINT AIRDROP INSPECTION RECORDS, MALFUNCTION/INCIDENT INVESTIGATIONS, AND ACTIVITY REPORTING
- AR 750-1: ARMY MATERIEL MAINTENANCE POLICY
- AR 750-32: AIRDROP, PARACHUTE RECOVERY, AND AIRCRAFT PERSONNEL ESCAPE SYSTEMS
- ATP 4-48: AERIAL DELIVERY
- ATP 3-18.11 SPECIAL FORCES MILITARY FREE-FALL OPERATIONS
- CAASOP ED. II
- CODE OF FEDERAL REGULATION (CFR) TITLE 14: AERONAUTICS AND SPACE
 - PART 105: PARACHUTE OPERATIONS
 - PART 65: CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREWMEMBERS.
- DA PAM 190-51: RISK ANALYSIS FOR UNCLASSIFIED ARMY RESOURCES
- DA PAM 738-751: FUNCTIONAL USERS MANUAL FOR THE ARMY MAINTENANCE MANAGEMENT SYSTEM-AVIATION (DA FORM 2408-27, 22, 28)
- DA PAM 750-1: COMMANDERS` MAINTENANCE HANDBOOK
- DA PAM 750-3: SOLDIERS` GUIDE FOR FIELD MAINTENANCE OPERATIONS
- FM 3-0: OPERATIONS
- FM 4-0: SUSTAINMENT OPERATIONS
- TB 43-0002-43: MAINTENANCE EXPENDITURE LIMITS FOR FSC GROUP 16, (FSC CLASS 1670)
- TB 43-0001-80: TECHNICAL BULLETIN ARMY EQUIPMENT DATA SHEETS PERSONNEL PARACHUTE AUTHORIZED FOR USE LIST (AAUL)
- TB 43-180: CALIBRATION AND REPAIR REQUIREMENTS FOR THE MAINTENANCE OF ARMY MATERIEL
- TC 3-21.220: STATIC LINE PARACHUTING TECHNIQUES AND TRAINING
- TC 18-11: SPECIAL FORCES MILITARY FREE-FALL AND DOUBLE-BAG STATIC LINE OPERATIONS
- TM 1670-1670-201-23: GENERAL MAINTENANCE OF PARACHUTES AND OTHER AIRDROP EQUIPMENT
- USASOC REG. 350-2: Airborne operations
- USSOCOM Manual 350-3: special operations forces baseline interoperable Airborne operations (parachuting) training standards

AERIAL DELIVERY

- TB 9-1300-385: MUNITIONS RESTRICTED OR SUSPENDED (M-21 CUTTERS)
- TM 43-0001-39: ARMY AMMUNITION DATA SHEETS CARTRIDGES, CARTRIDGE ACTUATED DEVICES (CADS) AND PROPELLANT ACTUATED DEVICES (PADS)
- TM 10-1670-268-206P: TYPE V PLATFORM AND DRAS PLATFORMS
- TM 10-1670-276-236P: 26' HIGH VELOCITY CP
- TM 10-1670-277-236P: 28' EXTRACTION
- TM 10-1670-278-236P: 15' EXTRACTION
- TM 10-1670-279-236P: 22' EXTRACTION
- TM 10-1670-280-236P: G-11
- TM 10-1670-281-236P: G-12
- TM 10-1670-282-236P: G-14
- TM 10-1670-286-236P: EXTRACTION LINE PANEL
- TM 10-1670-296-206P: AIRDROP ANCILLARY EQUIPMENT (EFTC, M-1 ETC.)
- TM 10-1670-298-236P: CDS (A-7A, A-21, A-22)
- TM 10-1670-330-136P: JPADS 10K
- TM 10-1670-331-236P: LOW COST PARACHUTE ASSEMBLIES (LCLA, T-10C)
- TM 10-1670-334-236P: JPADS 2K
- TM 10-1670-336-236P: G-16
- TM 10-1670-339-236P: G-15
- TM 10-1670-340-236P:110" CARGO EXTRACTION
- TM 10-1670-343-236P: JPAD MAGU

AIRDROP RIGGING

- TM 4-48.01: RIGGING POTABLE WATER AND WATER PURIFICATION UNITS.
- TM 4-48.02: AIRDROP PLATFORMS; AIRDROP DERIGGING AND RECOVERY PROCEDURES REFERENCE DATA FOR AIRDROP PLATFORM LOADS
- TM 4-48.03: RIGGING CDS
- TM 4-48.04: RIGGING FOR SPECIAL OPERATIONS
- TM 4-48.05: DRAS
- TM 4-48.06: 5 TON TRUCKS
- TM 4-48.07: RAPID RUNWAY REPAIR KIT AND MILITARY BRIDGES
- TM 4-48.08: MILITARY UTILITY VEHICLES
- TM 4-48.12: TYPICAL SUPPLY LOADS (ROSES)
- TM 4-48.13: TRAILERS
- TM 4-48.14: HUMANITARIAN AIRDROPS
- TM 4-48.15: AMMUNITION SYSTEMS
- TM 4-48.16: AMMUNITION
- TM 4-48.17: HMMWV
- TM 4-48.18: FARE 6 AAFARS (FUEL)
- TM 4-48.19: HOWITZERS
- TM 4-48.21: ENGINEER EQUIPMENT (TRACTORS)
- TM 4-48.22: ENGINEER EQUIPMENT (WHEELED)
- TM 4-48.23: FMTVS
- TM 4-48.25: FORKLIFT TRUCKS; WHOLE BLOOD; COMMUNICATION SHELTERS; TRACKED VEHICLES

Cargo Parachutes

SUSPENDED WEIGHT (LBS) (W/OUT PARACHUTE)			MINIMUM DROP ALTITUDE (FEET AGL)
PARACHUTE	MINIMUM WEIGHT	MAXIMU M	
HIGH VELOCITY			
1 x 68" PILOT	75	150	100
3 x 68" PILOT	151	500	100
12-FT HV	151	500	400
15-FT EXT	151	500	400
26-FT HV	501	2,200	500
22-FT EXT	501	2,200	500
MEDIUM VELOCITY			
G-15			
GRAVITY	501	2,200	400
EXTRACTION	1,000	2,000	400
LOW VELOCITY			
1 x 68" PILOT	30	50	100
3 x 68" PILOT	51	200	100
T-10 MOD CARGO	90	500	300
G-16			
1 - 4	2,500	22,000	750
5 - 8	22,001	42,000	975
G-14			
1	200	500	300
2	501	1,000	300
3	1,001	1,500	400
G-12E			
1	501	2,200	475
2	2,270	4,000	550
G-11B			
1	2,270	5,000	700
2	5,001	10,000	750
3	10,001	15,000	750
4	15,001	20,000	750
G-11C			
5	20,001	25,000	1,150
6	25,001	30,000	1,200
7	30,001	35,000	1,200
8	35,001	40,000	1,300
LCLA			
LCLV	501	2,200	850
Cross	80	200	150
Double Cross	201	400	150
JPADS (RAM AIR CARGO)			
2K MAGU	700	2,150	3,500 TRN, 5,000 OPER.
10K	4,500	9,500	3,500 TRN Extrac. Only 5,000 OPR. Extrac or Grav.

Platforms

LENGTH (feet)	WIDTH (Inches)	WEIGHT (pounds)	PLATFORM SURFACE (square feet)	MINIMUM RIGGED WEIGHT (pounds)	C-130 H/J MAXIMUM RIGGED WEIGHT (pounds)	C-17 MAXIMUM RIGGED WEIGHT (pounds)
8	108	820	72	2,520	15,000	10,000
12	108	1,220	108	3,780	21,000	18,500
16	108	1,590	144	5,040	28,000	28,000
20	108	1,950	180	6,300	39,000	39,000
24	108	2,280	216	7,560	42,000	42,000
28	108	2,820	252	8,820	42,000	42,000
32	108	3,056	288	10,080	42,000	42,000
DUAL ROW AIRDROP SYSTEM PLATFORMS						
18	88	1,590 w/o DOR	132	7,500	N/A	14,500
18	88	1,942 w/ DOR	132	7,500	N/A	14,500

STATIC LINE

- TM 10-1670-299-206P: PERSONNEL ANCILLARY EQUIPMENT (MAWC, HSPR, ETC.)
- TM 10-1670-326-236P: T-11/ T-11R
- TM 10-1670-327-236P: MC-6/ T-11R
- TM 10-1670-332-236P: (AEBP)
- TM 5-4220-201-12: B-7 LIFE PRESERVE UNIT
- TM 1-4220-252: USAF FLOTATION EQUIPMENT (LPU-10/P)

	WEIGHT	MAX SUPPORTED WEIGHT	RATE OF DECENT	REPACK CYCLE
MC-6	29 lbs	400 lbs	16 FPS	182 Days
T-11M	38 LBS	400 lbs	18.5 FPS	182 Days
T-11R	14.8 lbs	400 lbs	26 FPS	365 Days

MILITARY FREE-FALL

- TM 10-1670-300-206P: ANCILLARY EQUIPMENT FOR MFF(ALTIMETERS ETC.)
- TM 10-1670-305-236P: TEST CHAMBERS
- TM 10-1670-329-136P: PARACHUTIST OXYGEN MASK (POM)
- TM 10-1670-335-236P: RA-1
- TM 10-1670-342-10: PARA.NAV.SYS
- TO 15X-1-1: Maintenance instruction - oxygen equipment

	GLIDE RATIO	MAX SUPPORTED WEIGHT	RATE OF DECENT	REPACK CYCLE
RA-1M	4:1	450 lbs	9-13 FPS	180 Days
RA-1R	4:1	450 lbs	9-13 FPS	180 Days

SLING LOAD

- TM 10-1670-295-136P: SLING SETS AND CARGO NETS
- TM 4-48.09: SLING LOAD BASIC OPERATIONS AND EQUIPMENT
- TM 4-48.10: SINGLE POINT SLING LOAD
- TM 4-48.11: DUAL POINT SLING LOAD

LOAD CONFIGURATIONS

- Single-Point Loads: Single-point loads are one load rigged and one aircraft cargo hook used during flight.
- Dual-Point Loads: Dual-point loads are one load rigged and two aircraft cargo hooks used during flight.
- Tandem Loads: Tandem loads are two loads rigged, one in front of the other, and two aircraft cargo hooks used during flight.
- Side-by-Side (Shotgun) Loads: Side-by-side (shotgun) loads are two loads rigged, one beside the other, and one or two aircraft cargo hooks used during flight.