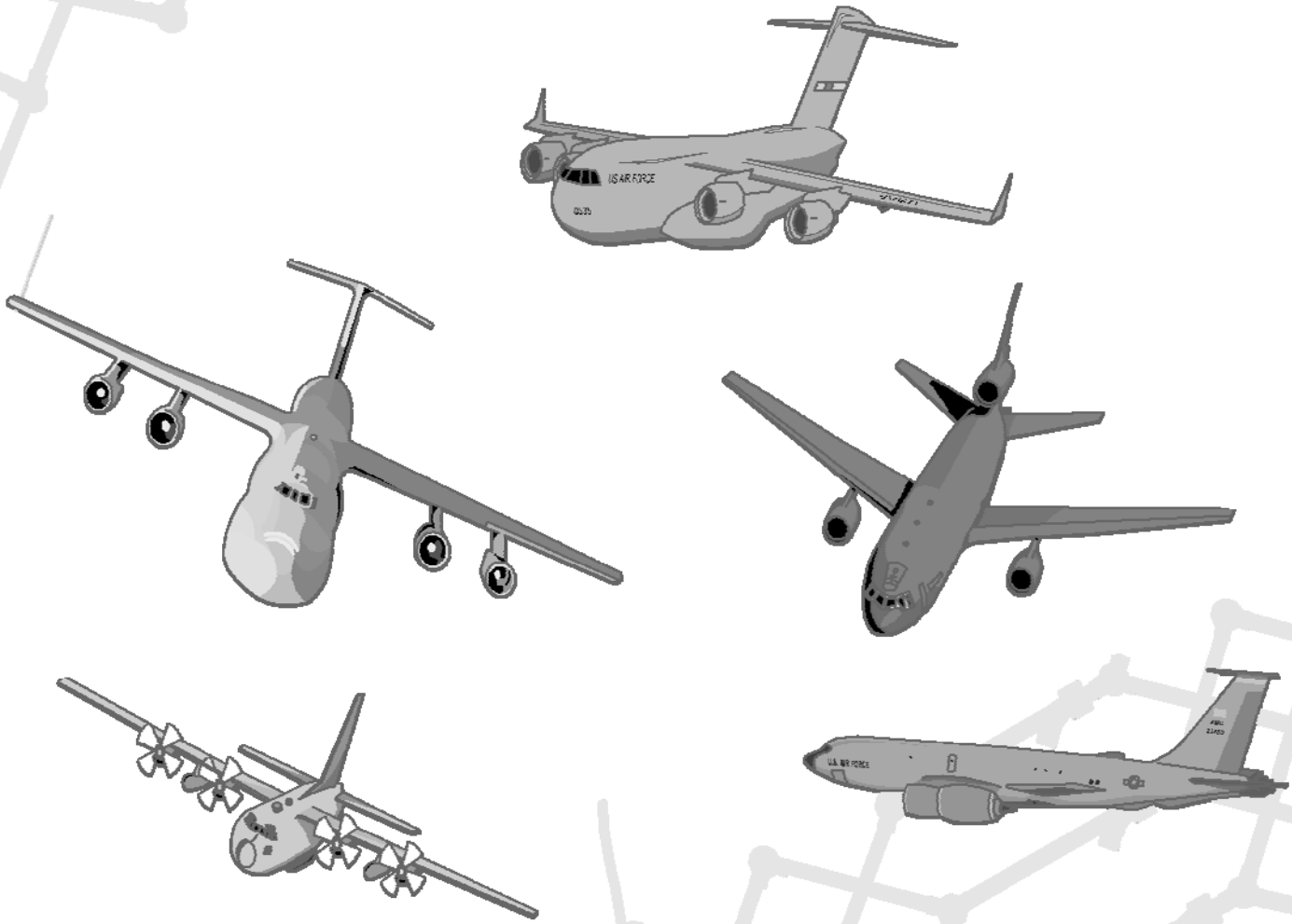
AMC AFFILIATED CONTINGENCY LOAD PLANNING WORKBOOK 36-101 VOLUME 2 AIRLIFT PLANNERS COURSE



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CAO: 1 Jan 2015 (SMSgt Wesley)

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Phase II

Introduction:

AMC Affiliated Contingency Load Planning (ACLP) PROGRAM
AIRLIFT PLANNERS COURSE

Overview: The Airlift Planners Course is designed to educate personnel on how to properly complete load planning duties as contingency airlift users on AMC aircraft.

NOTE: *To attend Phase II training, students must have successfully completed Phase I training. (Exception: Air Combat Command affiliated units are exempt from Phase I training provided students attend a host-base equipment preparation course and material covered meets affiliation training Phase I requirements).*

Phase I - AMC ACLP Workbook 36-101 Volume 1 - *(Equipment Preparation)*
This training is designed to educate personnel (E-4 and below) in the mechanics of preparing cargo, equipment, and personnel for cargo aircraft loading. The course consists of 16 hours (2 days) of academic instruction if taught in residence, or 8 hours (1 day) of academic instruction if completed in conjunction with the Equipment Preparation Introductory Course (EPIC) web based training. Although this course is designed for individuals (E-4 and below) who will actually prepare, load, and tie down unit equipment, any unit individual may attend. All class members will be expected to participate in the total preparation and loading exercise.

Equipment preparation: includes general and specific supported force responsibilities, marshalling, joint inspection, palletization, material handling equipment (MHE), shoring requirements, and weighing and marking cargo.

Safety: emphasizes the aspects of airlift mobility that are essential to efficient mission accomplishment.

Phase II - AMC ACLP Workbook 36-101 Volume II - *(Airlift Planner's Course)*
This training is designed to educate unit movement officers and supervisory personnel (E-5 or above) in airlift planning and execution of joint combat airlift operations. Individuals not fitting within the rank structure may be admitted by submitting written verification from their commander indicating they are active participants in the load planning phase of airlift operations. Personnel attending this course must have a minimum retainability in the logistics duty position of one year.

Principles of load planning: (Phase II) consists of aircraft weight and balance, load planning principles, aircraft characteristics, and manifesting. The course consists of 48 hours (6 days) of training. Upon successful course completion, personnel will receive certification via AMC Form 9, Airlift Load Plan Certification with either PDS Code 9N1 (USAF) and M9T (USMC). Graduates of Phase II will be certified as an aircraft load planner with certification valid for 24 months. The AF Form 1256 and the AMC Form 9 will serve as source document.
NOTE: *This publication is written as a classroom aid. It is* ***non-directive*** *in nature and is not to be used as an official reference for mobility planning or execution.*

LOAD PLANNING

chapter

1

AMC

Lesson Objectives: The objectives of this lesson is for each student to comprehend the load planning process.

References:
DOD 4500.9-R, Part II, Cargo Movement, Defense Transportation Regulation (DTR)
DOD 4500.9-R, Part III, Mobility, Defense Transportation Regulation (DTR)
T.O. 1C-130A-9, Cargo Loading Manual
T.O. 1C-130J-9, Cargo Loading Manual
T.O. 1C-5A-9, Loading Instructions
T.O. 1C-17A-9, Technical Manual Cargo Loading Instructions
T.O. 1C-10(K)A-9, Cargo Loading Manual
TB-55-46-1/NAVY NAVFAC P-1055, Standard Characteristics for Transportability of Military Vehicle and Other Oversized/Weight Equipment
AMCI 24-101 Volume 11 Cargo and Mail Policy

Web Pages: http://www.transcom.mil/dtr/dtrHome/ (DTR)

Learning Activities:

1. General information
2. Airlift Load Planner's responsibilities
3. Movement planning phases
4. Load planning
5. USAF Internal Air Transport Certification
6. DD Form 2131
7. DD Form 1385
8. Mobility Transportation Control Numbers (TCN)
9. Intransit Visibility (ITV)

Test Objectives:

1. Define in your own words the various load planning terms
2. Describe the phases associated with load planning
3. Distinguish between the different forms associated with load planning
4. Describe the responsibilities associated with load planning.

LOAD PLANNING

1.1. General. Load planning is the process to determine in advance, the number and type of aircraft required to transport your unit's cargo.

1.1.1. Terminology. The following terms are used extensively in load planning to distinguish the type of movement:

INTER-Theater: Refers to movement between theaters of operation or between CONUS and a theater of operation. (i.e. CONUS to CENTCOM AOR)

INTRA-Theater: Refers to movement inside a theater of operation. (i.e. Kuwait to Iraq - inside CENTCOM AOR)

1.1.2. Cargo Characteristics.

A. **Bulk cargo:** Includes items that will fit on a 463L pallet; i.e. 104 inches by 84 inches by 96 inches.

B. **Oversize cargo:** Includes air cargo exceeding the usable dimension of a 463L pallet. This cargo is air transportable on the C-5, C-17, C-130, KC-10, and most civilian contract cargo carriers. For example the M-1008, M-923, M-35, M-149A2 or MJ-1 bomb loader.

C. **Outsize cargo:** Cargo that exceeds the dimensions of oversized cargo and requires the use of a C-5 or C-17 aircraft or surface transportation. For example, the M-1 tank or a 40-foot refrigeration tractor trailer combination.

1.1.3. Advantages of load planning include:

A. Helps the unit establish the priority for the movement of cargo and personnel.

B. Identifies the exact number of aircraft required to accomplish a particular mission.

C. Identifies required loading aids in advance to be sure they are available at load time. Aircraft ground time can be kept to a minimum when the unit is prepared to load.

LOAD PLANNING

1.2. Airlift Planner Responsibilities. Many factors must be considered in the load planning process. The primary responsibility of the load planner is to ensure the **safe and efficient** use of the aircraft. The load planner must comply with:

A. Aircraft safety and floor load restrictions.
B. The load must be within center of balance range for takeoff, flight, and landing.
C. The two big "E's," ease of onload and ease of offload. Improper planning can result in increased loading/offloading time or in-flight structural failure. A load properly planned and coordinated will go on the aircraft quickly and safely. Vehicles are normally backed into C-130 and C-17 aircraft.
D. Movement priority of cargo. Follow the guidance of your commander and ensure that cargo will move in the proper sequence to accomplish the mission.
E. Emergency Jettisoning must be considered. Pallets must always go behind vehicles unless prior coordination is accomplished.
F. Hazardous cargo considerations. Cryogenic cargo that requires venting must be placed near an aircraft cryogenic vent. The hazardous cargo must be accessible, segregated if required, etc..
G. Passengers will not be seated closer than 30 inches forward of netted or strapped cargo. Passengers will not be seated aft of pallets unless prior coordination is accomplished.
H. A baggage pallet will be built with 20 or more passengers (10 for the KC-10 due to FAA restrictions), unless otherwise coordinated with the aircrew/CRE.

1.3. Movement Planning Phases. Additional information is located in 4500.9 DTR Part III, Chapter 303. Movement/Deployment Planning has two phases; 1) Planning/ Preparation and 2) Execution. During Planning/Preparation the unit identifies equipment and troops to be airlifted and how many of each type aircraft they will need. This phase may be repeated many times to refine the movement or to reduce the total aircraft requirement. Preplanned load plans will be accomplished during the planning and preparation phase. During Execution, load planners will complete the final load plan. The final load plans may differ from the preplanned ones due to a change in unit movement priorities, an aircraft scheduling change, or equipment breakage in the marshalling yard.

1.3.1. User Role in Movement. To properly load plan your organization's equipment and personnel for a required mission, you must understand your role in the movement process. When your unit is tasked, the requirements for that tasking are contained in the Time Phase Force Deployment Data (TPFDD). The TPFDD is a database used to coordinate the movement of forces into their operational locations. It contains information specifically identifying your unit's personnel and equipment requirements for the mission, as well as information regarding when & how your unit will deploy & return. Your unit is identified in this database with a unique Requirement Identification (REQID) number. The REQID may also be known as a Unit Line Number (ULN) or Force Requirement Number (FRN). Your data from the TPFDD, identified by the REQID (UNL or FRN), is required for you to know the "Who/What/When/Where" to complete aircraft load plans.

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Your unit movement personnel should be familiar with this data and provide it as required. Once you know the equipment & personnel required, you will typically create aircraft load plans using the information provided in this course. Additionally, you will complete a Hazardous Cargo Aircraft Clearance Worksheet also known as a HAZDIP (see Figure 1.2). The HAZDIP is used to identify the primary hazard class of cargo you will be transporting for planning purposes. This information is used by mission planners and US State Department personnel to obtain diplomatic clearance for your cargo to transit other countries en route to or from your deployed location. Once completed, you must submit load plans and HAZDIPs to the Contingency Verification Specialists at 618 AOC/XOPF. This office will then compare your load plan information against REQID data in the TPFDD. The load plan data must be within +/- 5% of the TPFDD requirements, and +/- 5 passengers before aircraft are planned/tasked. To submit your information or if you have any questions, contact:
TACC.XOPC.Verifications@us.af.mil

1.3.2. Civil Reserve Air Fleet (CRAF) Movements. The CRAF represents approximately one-half of AMC's total strategic wartime airlift capability. These contracted carriers maintain final authority with regard to cargo load planned for their aircraft. Contact HQ AMC/DOF for the current telephone listing of specific carrier operations centers. Expertise and guidance for load planning and equipment is provided through these centers. See AMCPAM 24-2 Vol1 and chapter 8 of this volume for further information.

1.4. Load planning. After identifying the cargo and personnel to be airlifted and movement priorities have been established, complete the load planning forms for the appropriate type aircraft. This will typically be accomplished utilizing ICODES load planning software.

1.4.1. **ICODES Load plan**. The ICODES load plan (figure 1.1.) is the new standard for all DoD cargo movement. During the initial Movement Planning Phase, individual aircraft load plans are completed using planning data. Prior to movement, this data is replaced with actual information to include specific aircraft to be utilized, cargo & passenger weights, as well as any other updated information needed to produce the final aircraft load plan. The following list is not all inclusive, but contains emphasized items that should be included on load plans. (For assistance contact your affiliated AMCU).

A. Departure/Destination airfields. Use International Civil Aviation Organization (ICAO) 4 letter ID. (Example: Ft. Campbell Army Airfield = KHOP)
B. Chalk Number. Used to identify cargo designated for a particular aircraft.
C. Transportation Control Number (TCN). 17 digit ID number for each cargo line item. See paragraph 1.X and figure 1.X for instructions.
D. The Hazard Class for each cargo item on the load plan.
E. Unit Line Number (ULN). The associated ULN for all cargo and passengers manifested on the aircraft.
F. Ensure AFMAN 24-204 Chapter 3 Move is selected if applicable.
G. All mission & aircraft data to include actual operating weight & moment if known.

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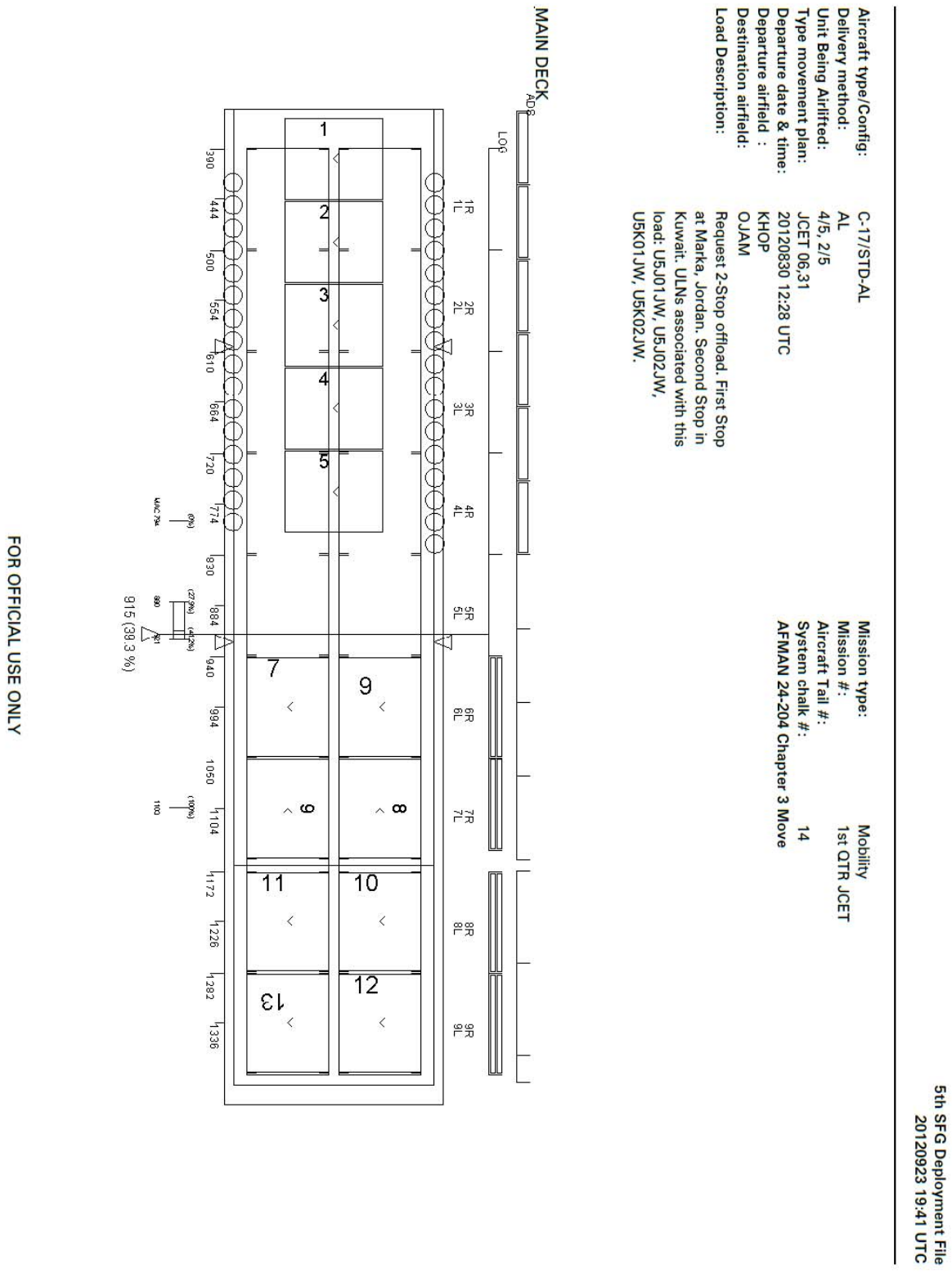

Figure 1.1. Example ICODES Load Plan

LOAD PLANNING

SQ/D	TCN/Pallet ID	Bumper	Model/Nomenclature	LEN	WDT	HT	WT	FSN	TSN	CB	HZ	FL	V	D	SH	CCC
1/M	AWH05C2$0F03100XX		ISU-90 BUE/ISU-90 BUE	108	88	90	7000	357	445	401	N		N	A		J3D
2/M	AWH05C2$0F03000XX		ISU-90 BUE/ISU-90 BUE	108	88	90	7000	447	535	491	N		N	A		J3D
3/M	AWJQ3B0$0F03600XX		ISU-90/ISU90 BUE	108	88	90	6000	537	625	581	N		N	A		J3D
4/M	AWJQ3B0$0F03500XX		463L BUE/463L BUE	108	88	62	5000	627	715	671	Y		N	A		J3D
5/M	AWJQ3B0$0F03500XX		463L Zodiacs/463L Zodiacs	108	88	62	5000	717	805	761	Y		N	A		J3D
6/M	AWJQ3B0$0F03500XX		463L AMMO/463L AMMO	88	108	62	7000	940	1048	994	Y		N	A		J3D
7/M	AWH05C2$0F03200XX		463L AMMO/463L AMMO	88	108	62	4000	940	1048	994	N		N	A		J3D
8/M	AWJQ3B0$0F03200XX		ISU-90 BUE/ISU-90 BUE	108	88	90	7000	1050	1158	1104	N		N	A		J3D
9/M	AWJQ3B0$0F03500XX		ISU-90 BUE/ISU-90 BUE	108	88	90	7000	1050	1158	1104	N		N	A		J3D
10/M	AWJQ3B0$0F03300XX		463L AMMO/463L AMMO	88	108	62	8000	1172	1280	1226	Y		N	A		J3D
11/M	AWJQ3B0$0F03100XX		463L BUE/463L BUE	88	108	62	7000	1172	1280	1226	N		N	A		J3D
12/M	AWJQ3B0$0F03000XX		463L AMMO/463L AMMO	88	108	62	8000	1282	1390	1336	Y		N	A		J3D
13/M	AWJQ3B0$0F03400XX		463L BUE/463L BUE	88	108	62	7000	1282	1390	1336	Y		N	A		J3D

Total # of Pax:	33	Weight/Pax:	210	Total PAX Weight:	6930
Total # of Subfloors:	0	Weight/Subfloor:	0	Total Subfloor Weight:	0
Total Cargo Wt:	85000	%ACL:	102	ACL:	90000
Cargo/Mail Weight:	85000	Cargo/Mail Moment:	8598		
Operating Weight:	284945	Operating Moment:	25891		
Zero Fuel Weight:	376875	Zero Fuel Moment:	34489		
CG Station:	915	%MAC:	39.3		

SQ/D	Flags/Warnings
- / -	Total load weight, 91930 lb, is greater than the planning ACL, 90000 lb.
4/M	Hazard Violation due to incompatible items or an item containing incompatible hazards. This can occur when an association is created between incompatible items or incompatible multiple hazards are added to an item.
4/M	These items are incompatible in their current configurations. This problem could be a result of being stowed using Breakbulk by Cube or their placement within a breakbulk group shell. This can also occur when an association is created between incompatible items or incompatible multiple hazards are added to an item.
5/M	These items are incompatible in their current configurations. This problem could be a result of being stowed using Breakbulk by Cube or their placement within a breakbulk group shell. This can also occur when an association is created between incompatible items or incompatible multiple hazards are added to an item.
10/M	The two items may be carried in the same compartment or hold but must have a minimum separation of 88 inches (2.2 meters) in all directions.
12/M	These items are incompatible in their current configurations. This problem could be a result of being stowed using Breakbulk by Cube or their placement within a breakbulk group shell. This can also occur when an association is created between incompatible items or incompatible multiple hazards are added

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Figure 1.1. Example ICODES Load Plan (continued)

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	to an item.
12/M	These items are incompatible in their current configurations. This problem could be a result of being stowed using Breakbulk by Cube or their placement within a breakbulk group shell. This can also occur when an association is created between incompatible items or incompatible multiple hazards are added to an item.
12/M	These items are incompatible in their current configurations. This problem could be a result of being stowed using Breakbulk by Cube or their placement within a breakbulk group shell. This can also occur when an association is created between incompatible items or incompatible multiple hazards are added to an item.
12/M	Two explosives in conflicting compatibility groups may not be stowed in the same compartment, portable magazine or transport unit.
12/M	Two explosives in conflicting compatibility groups may not be stowed in the same compartment, portable magazine or transport unit.
13/M	The two items may be carried in the same compartment or hold but must have a minimum separation of 88 inches (2.2 meters) in all directions.
13/M	These items are incompatible in their current configurations. This problem could be a result of being stowed using Breakbulk by Cube or their placement within a breakbulk group shell. This can also occur when an association is created between incompatible items or incompatible multiple hazards are added to an item.

SQ/D	Class/Zone
4/M	2.1
4/M	2.2
4/M	3
4/M	8
4/M	9
5/M	3
5/M	8
5/M	9
6/M	1.4S
10/M	1.4S
12/M	1.1D
12/M	1.1E
12/M	1.3G
12/M	1.4B
12/M	1.4S
13/M	2.1
13/M	2.2
13/M	9

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Figure 1.1. Example ICODES Load Plan (continued)

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ULN	PAX
U5J02JW	9
U5J01JW	6
U5K01JW	8
U5K02JW	9
U5K01JW	1

Item by TCN/Pallet ID	ULN	Weight	Short Tons
AWH05C2$0F03000XX/	U5K01JW	7000	3.50
AWH05C2$0F03100XX/	U5K01JW	7000	3.50
AWH05C2$0F03200XX/	U5K01JW	4000	2.00
AWJQ3B0$0F03000XX/	U5J01JW	8000	4.00
AWJQ3B0$0F03100XX/	U5J01JW	7000	3.50
AWJQ3B0$0F03200XX/	U5J01JW	7000	3.50
AWJQ3B0$0F03300XX/	U5J02JW	8000	4.00
AWJQ3B0$0F03400XX/	U5J02JW	7000	3.50
AWJQ3B0$0F03500XX/	U5J02JW	7000	3.50
AWJQ3B0$0F03500XX/	U5K02JW	5000	2.50
AWJQ3B0$0F03500XX/	U5K02JW	7000	3.50
AWJQ3B0$0F03500XX/	U5K02JW	5000	2.50
AWJQ3B0$0F03600XX/	U5K02JW	6000	3.00

ALL HAZARDOUS MATERIALS COVERED BY THIS MANIFEST HAVE BEEN INSPECTED AND FOUND TO BE PACKAGED IN THE PROPER OUTSIDE CONTAINER FREE OF VISIBLE DAMAGE AND LEAKS AND IS PROPERLY CERTIFIED

I HAVE BEEN BRIEFED ACCORDING TO AFMAN 24-204(I), PARAGRAPH 1.2.9, ON HAZARDOUS CARGO COVERED BY THIS MANIFEST

____
Air Terminal Representative Signature

____
Aircraft Crewmenber Signature

Load planned by: ____________________ **Date:** ______________

Load approved ____________________ **Date:** ______________

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Figure 1.1. Example ICODES Load Plan (continued)

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1.4.1.1. **Load plan Distribution**. Seven copies of aircraft load plans are required and will be distributed to the following:

Departure airfield mobility force.
Departure Airfield Operations.
Loading team chief
Aircraft Loadmaster or Boom Operator
Arrival airfield mobility force
Plane load/troop commander
Arrival Airfield Operations

Additional copies may be required for customs and foreign clearances on missions operating outside the United States. Allow 1 additional copy per en route station (more if transiting non-AMC locations). For country specific information, consult the DoD Foreign Clearance Guide which may be found at https://www.fcg.pentagon.mil/fcg.cfm.

1.4.2. **Hazardous Diplomatic Clearance Worksheet (HAZDIP).** The HAZDIP (figure 1.2) is used to identify hazardous material to mission planning personnel for clearance purposes. These personnel work closely with the US State Department to arrange permission for the hazardous cargo to transit other countries en route to its destination. A HAZDIP is required for **each** aircraft load plan (chalk) identifying all hazards, and needs to include:

•Proper Shipping Name (PSN) - Combine all like PSNs/UNs on one line
•United Nation Number (UN), - Combine all like PSNs/UNs on one line
•Number of pieces
•Weight in pounds for each line item (Exception: use kilograms for N.E.W.)
•Net Explosive Weight (N.E.W.) for explosives only in kilograms
•Hazard class
•Use International Civil Aviation Organization (ICAO) 4 letter IDs
•APOE/APOD of strategic validation not necessarily the originating or final Destination

1.4.3. Submitting Load Plans and HAZDIPS for Validation. Submit load plans and HAZ DIPs to 618 AOC/XOPF based off Available Load Date (ALD) within the following timelines:

- No Earlier Than (NET) 21 days
- No Later Than (NLT) 10 days prior
- Within 96 hours of ALD for short-notice requirements validated by USTRANSCOM

Submit to: TACC.XOPC.VERIFICATIONS@US.AF.MIL

618th Tanker Airlift Control Center
International Clearance Branch
618 TACC/XOCZD
COMM: (618) 229-3008 (DSN: 779)
Scott Air Force Base, Illinois 62225

Purpose: Coordinate aircraft clearance requests for missions with hazardous cargo.

Instruction:

1. This worksheet **MUST** be filled out **COMPLETELY** in order for the International Clearance Branch to coordinate diplomatic clearances.
2. Refer to the Foreign Clearance Guide for lead time requirements (Take into account countries that must be overflown to get to destination).
3. Mission identification **MUST** be the **ORIGINATING** mission number, not the mission identification number at the point of onload.
4. Submit this worksheet **NLT** two days **PRIOR** to the longest country lead time; take into account weekends and US/foreign holidays.
5. Aerial Ports: Submit your email request to TACC/XOCZD with ONE attached worksheet. Do not submit with RMS Explosive Clearance Requests attached.
6. Email to TACC/XOCZD at tacc.tadip@scott.af.mil Don't have email access? Call us at DSN 779-3008 for alternatives.
7. Flying organizations submitting clearance requests through Logbook should attach a copy of this worksheet directly to the mission in Logbook.

NOTE 1 FOR AMMUNITION, FLARES, ETC., Pieces = number of boxes, not units (e.g. 5 boxes, not 2500 rounds);

NOTE 2 Use four letter ICAO for onload and offload (e.g. Incirlik AB = LTAG)

NOTE 3 Bahrain requires all hazardous cargo items be detailed by the piece and identify the weight in kilograms. Each item must be listed separately. (e.g. If you have a package of 10 batteries, the weight of the box in kilograms must be identified on this form)

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Originating Mission Number:
Aircraft Call Sign:
Unit:
POC NAME:
POC DSN PHONE:
POC EMAIL:
Comments: ULN HERE CHALK #

HAZARDOUS CARGO AIRCRAFT CLEARANCE REQUEST

Proper Shipping Name	UN #	See NOTE 1 Pieces or Packages	Weight in Pounds	See NOTE 3 Weight in Kilograms	N.E.W. in Kilograms	Class and Div	See NOTE 2 Onload ICAO	See NOTE 2 Offload ICAO
Vehicle, Flammable Liquid Powered	UN3166	1	2,000	909		9	POE	POD

Figure 1.2. Example Hazardous Diplomatic Clearance Worksheet (HAZDIP)

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1.5. United States Air Force Internal Air Transport Certification. By Department of Defense Instruction (DoDI 4540.07), any item of cargo that exceeds any one of the criteria below will require certification that the item is approved for airlift. This certification is issued by the Air Force Aeronautical Systems Center Engineering Directorate, Flight Systems Division, Crew Systems Branch, Air Transportability Test Loading Activity (ASC/ENFC (ATTLA)). A copy of the certification memorandum shall accompany the item when it is presented for load processing. Some common vehicles have the certification memorandums on file within the joint commands.

1.5.1. Criteria – Characteristics Requiring Analysis

- Greater than Length: 240 inches (20 feet)
- Greater than Width: 96 inches (8 feet)
- Greater than Height: 96 inches (8 feet)
- Greater than Weight: 10,000 lbs
- Greater than 1600 lbs per linear foot
- Greater than 5,000 lbs per axle
- Greater than 2,500 lbs per tire
- Exceed floor contact pressure of 50 psi
- Requires the use of special loading procedures
- Require usage of aircraft electrical power or has to be electronically active inside the aircraft (portable command center, radios, transmitters, refrigerator etc…)
- Cargo is active or is used while in the aircraft
- Cargo occupied by personnel (need Aircraft Systems Group) concurrence if occupied by people during takeoff and landing)
- Susceptible to aircraft electromagnetic environment

1.5.2. Commercial Off-the-Shelf (COTS) vehicles are seldom equipped by the manufacturer to withstand the rigors of airlift, so some additions or changes are almost always necessary to airlift COTS equipment. Most commercial vehicles need ATTLA review to be airlifted due to their soft suspensions and the lack of sufficient restraint capability. The addition of tiedown rings and the use of sleeper shoring are often required to airlift commercial vehicles.

1.5.3. Obtaining Certification. The Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) is the U.S. Army central point of contact for obtaining vehicle/equipment air transport certification from Headquarters Air Force Material Command (HQ AFMC), Aeronautical Systems Center (ASC). U.S. Army units requiring airlift certification should, per DOD 5000.2, forward their requests to Director, SDDCTEA, ATTN: SDTE-DPE, Building 1900W, 1 Soldier Way, Scott AFB, IL 62225, with an information copy to Commander, FORSCOM, ATTN: AFOP-OCP, G3/5/7 C4I COMPASS, 4700 Knox Street Fort Bragg, NC 28310. The U.S. Navy central point of contact for obtaining airlift certification for Civil Engineer Support Equipment (CESE) is Commanding Officer, Naval Facilities Expeditionary Logistics Center, Code N442, CESE Management Branch, Building 1000, 23d Avenue, Port Hueneme,

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CA 93043. Other agencies will contact the Air Transportability Test Loading Agency (ATTLA) via e-mail at attla@wpafb.af.mil or by phone at DSN 785-2330/2547.

1.6. DD Form 2131 Passenger Manifest. At locations without automated passenger manifesting capabilities, the DD Form 2131 may be utilized as outlined below.

1.6.1. **Instructions for use of DD Form 2131.**

A. Use the DD Form 2131 to list the names of the deploying personnel. Units may use a typed list in place of the DD Form 2131 if the form is not available. However, the typed list must include all the information required on the DD Form 2131. The troop commander signs the anti-hijacking statement (shown below) on the passenger manifest, regardless of the form used.

> *"I certify that no unauthorized weapons/ammunition/explosive devices, or other prohibited items are in the possession of those personnel for whom I am designated manifesting representative or troop commander, and that their authorized weapons have been cleared."*

B. Fill in the applicable items as follows:

Block 1. MISSION NUMBER/CALL SIGN: Enter the appropriate Air Force mission number, JA/ATT mission number, SAAM mission number, exercise mission number, or other identifying mission number.

Block 2. AIRCRAFT TYPE (Tail Number)/VEHICLE/VESSEL:
Enter the 5-digit tail number of the aircraft flying the mission.

Block 3. POE: Use actual name of departure airfield . If classified, write "Classified."

Block 4. POD: Use actual name of destination airfield. If classified, write "Classified."

Block 5. DEPARTURE DATE (YYYYMMDD): Actual date form is completed.

Block 6. TIME (ZULU): Enter time (in Zulu) that aircraft is scheduled to depart.

Block 7a. NAME (Last, First, Middle): Self explanatory.

Block 7b.. RANK: Self explanatory.

Block 7c. SSN: Enter Social Security Number of passenger.

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Block 7d. STATUS: Active duty / Guard / Reserve.

Block 7e. ULN: Enter Unit Line Number of move.

Block 7f. LINE NO: Enter passenger line number (1, 2, 3, ... etc.).

Block 7g. SVC: Enter which service branch passenger is representing. (USAF/USA/USMC/USN).

Block 7h. BAGGAGE -- CHECKED (PIECES/WEIGHT): Enter number of pieces and weight of each passenger's checked baggage.

Block 7i. CARRY-ON WEIGHT: Enter weight of passenger's carry-on baggage.

Block 7j. PAX WEIGHT: Enter actual weight of passenger.

Block 7k. NAME (Last, First, Middle): Self explanatory.

Block 7l. TELEPHONE (Include area code): Self explanatory.

Block 8. MANIFEST TOTALS: Self explanatory.

Block 9. TOTAL WEIGHT PAX AND ALL BAGGAGE: Self explanatory.

Block 10. DATE/PRINTED NAME/GRADE/Signature: Enter information of assigned Troop Commander or individual completing form.

Distribution: Seven copies for CONUS movement:

1. One—Departure airfield mobility force.
2. One—Departure Airfield Operations.
3. One—Loading team chief.
4. One—Aircraft loadmaster or boom operator.
5. One—Arrival airfield mobility force.
6. One—Plane load/troop commander.
7. One—Arrival Airfield Operations.

NOTE: *Missions operating outside the CONUS require an additional eight copies for customs and foreign clearances.*

LOAD PLANNING

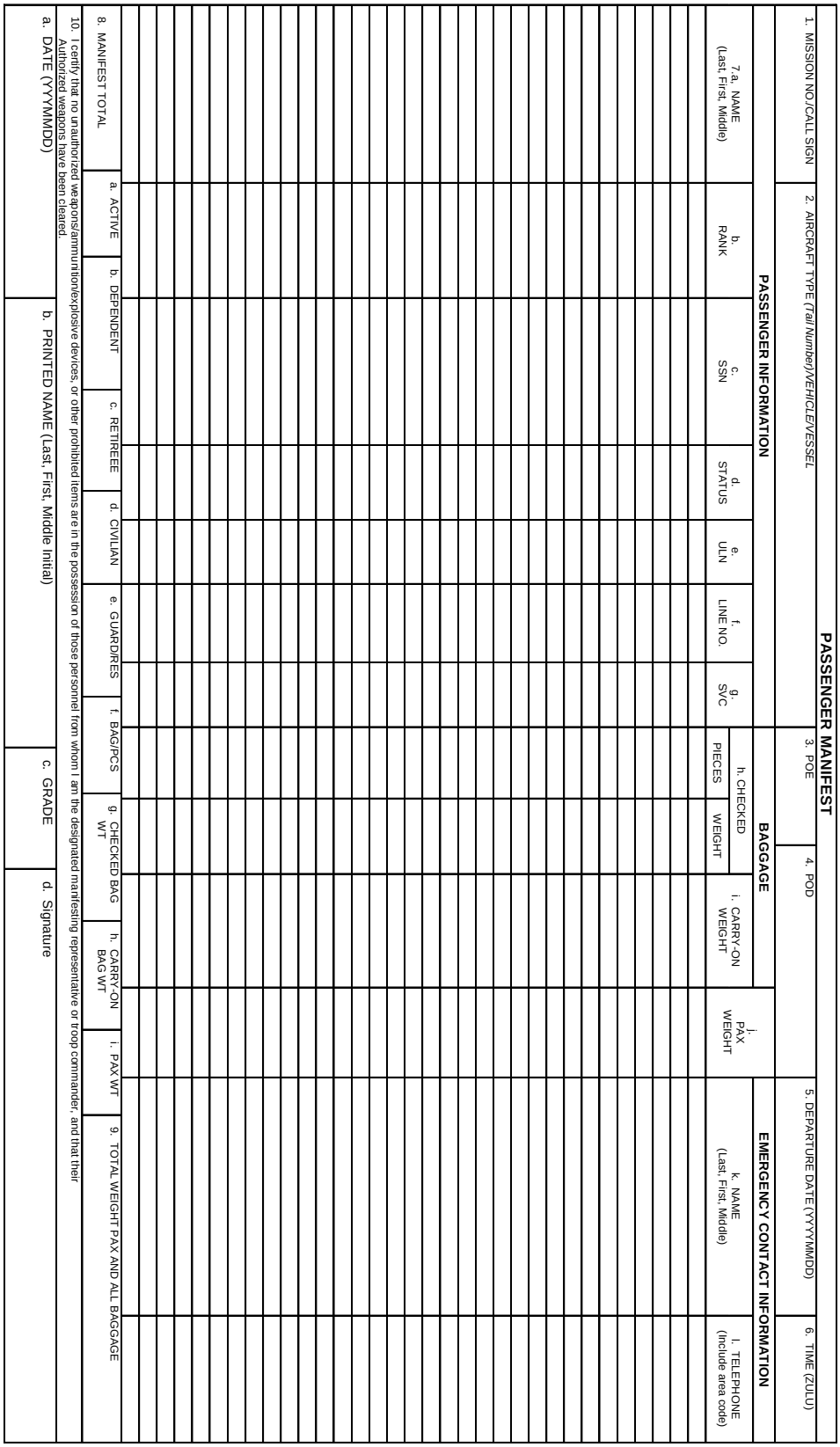

Figure 1.3. DD Form 2131 (Passenger Manifest)

LOAD PLANNING

1.7. DD Form 1385 Cargo Manifest. At locations without automated cargo manifesting capabilities, the DD Form 1385 will be used. The DD Form 1385 is an inventory of the cargo aboard an aircraft. Units may use a typed, handwritten, or computer generated list in place of the DD Form 1385 provided that it contains complete and information IAW DTR Part II. Various regulations require seven copies for CONUS movement and eight additional copies for customs and foreign clearances on missions operating outside the CONUS. Further guidance for cargo manifest completion may be obtained from local Unit Movement / Installation Transportation / Transportation Management Offices. (see figure 2.4.).

Distribution: Seven copies for CONUS movement:

1. One—Departure airfield mobility force.
2. One—Departure Airfield Operations.
3. One—Loading team chief.
4. One—Aircraft loadmaster or boom operator.
5. One—Arrival airfield mobility force.
6. One—Plane load/troop commander.
7. One—Arrival Airfield Operations.

NOTE: *Missions operating outside the CONUS require an additional eight copies for customs and foreign clearances.*

LOAD PLANNING

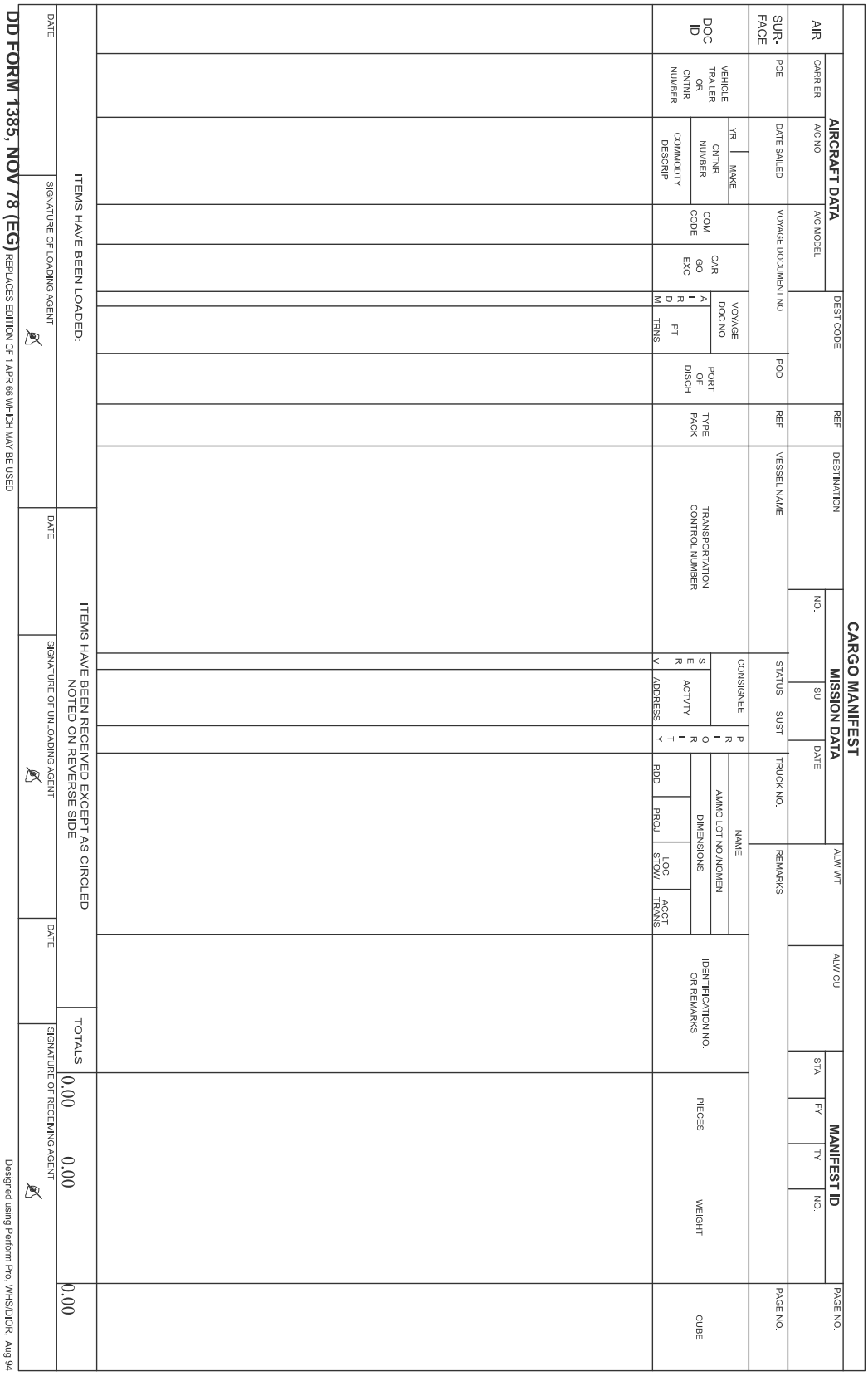

Figure 1.4. DD Form 1385 (Cargo Manifest)

LOAD PLANNING

1.8. Mobility Transportation Control Numbers. A key item for tracking cargo is the Transportation Control Number (TCN), a unique 17 digit number used to identify a particular piece of cargo. Each item of cargo will have its own TCN. Mobility TCNs must be constructed in a specific manner as outlined in DTR Part III - Mobility Appendix H. Further guidance for TCN construction may be obtained from local Unit Movement / Installation Transportation / Transportation Management Offices.

TCN (example)	**F**	**A**	**B**	**1**	**2**	**3**	**4**	**$**	**A**	**1**	**A**	**0**	**0**	**1**	**0**	**X**	**X**
Position	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**

Postion	Explanation
1	Service Code: A Army, M Marine Corps F Air Force, Z Coast Guard N Navy
2-8	Army: UIC for positions 2-7, "$" for position 8 All other Services: ULN with "$" filling in unused positions or UIC if ULN not provided
9-10	Service use, except for code "CH" which is reserved to identify small units (10 tons of equipment or less) moving by air. Requires data entry, do not leave blank. Use zeros if no data available
11-14	Shipment number, increment number, serial number.
15	Unit cargo TCN indicator. (Enter a zero here.)
16-17	Split/partial Shipment or complete shipment unit indicator XX - complete shipment AX,BX,CX... partial shipment XA,XB,XC... split shipment

Figure. 1.6. Mobility Transportation Control Number (TCN)

LOAD PLANNING

1.9. In-transit Visibility: Previously, mobility or contingency units were only required to provide a DD Form 2130 series load plan. However, DTR Part II now requires more information from deploying units. These changes in manifesting procedures are part of an effort to track cargo and personnel. Providing complete and accurate information on cargo and passenger manifests is imperative. All cargo data is entered into the Global Transportation Network (GTN) allowing In-transit Visibility (ITV); the ability to track the identity, status and location of DOD cargo and personnel from origin to destination. Using GTN, unit commanders and deployment officers can maintain visibility of a unit move and be able to track key equipment and personnel, whether by unit, chalk or individual.

A. The DOD community has several working definitions for In-transit Visibility. Generally speaking, and for the purposes of this course, we will use the definition cited by Ms. Mary Lou McHugh, former Assistant Deputy Undersecretary of Defense for Transportation Policy. "ITV is the ability to track the identity, status, and location of DOD unit and non-unit cargo and passengers, medical patients and personal property from origin to destination during peacetime, contingencies, and war". Simply stated, ITV knows where an asset is -- from an M-1A2 tank to an F-16 engine, from bullets to Sgt Jones -- from the time it enters the transportation system to the time it is delivered.

B. What does this mean to deploying units, and more specifically, to you? It simply means that you will need to provide more information about your load (cargo or passenger) to the air transportation professionals who are supporting your deployment. Gone are the days when a simple load list or load plans were all you needed to get off the ground.

C. Your unit move is visible to joint planning personnel at all levels. Daily, they make key decisions based on standard transportation data captured by the United States Transportation Command's (USTRANSCOM) GTN. The transportation professionals who process and manifest your cargo and passengers for movement provide this data. They need your help to capture this information.

D. What else does ITV mean to you? It also means that using GTN, you, as a unit deployment officer or non-commissioned officer, can maintain visibility of your unit's move until the aircraft has reached its destination. Not only will you be satisfied that your unit's deployment was successful, but you will also be able to track key pieces of equipment that may have been separated from the unit during the trip. These items will be easier to locate within the airlift system once they start moving again.

E. How can I provide my share to the ITV pie, you might ask? It's simple; all it takes is close coordination with your unit's Installation Transportation Office or Transportation Management Office (ITO or TMO). These transportation professionals are knowledgeable in the data required by DTR Part II.

AIRCRAFT WEIGHT AND BALANCE

chapter

2

AMC

Lesson Objectives: The objective of this lesson is for each student to apply weight and balance computations.

References: DOD 4500.9-R Part III, Mobility, Defense Transportation Regulation (DTR)
1C-130A-9, Cargo Loading Manual
1C-5A-9, Loading Instructions
1C-17A-9, Technical Manual Cargo Loading Instructions
1C-10(K)A-9, Cargo Loading Manual
1C-135(K)A-9, Technical Manual Cargo Loading Instructions

Web Pages: http://www.transcom.mil/dtr/dtrHome/ (DTR)

Learning Activities:

1. Aircraft center of balance
2. Aircraft planning characteristics
3. Weight and balance theories
4. Center of balance computations
5. Student exercise

Test Objectives:

1. Explain terms associated with aircraft weight and balance
2. Explain aircraft planning characteristics
3. Describe the two theories associated with weight and balance
4. Demonstrate center of balance computations

AIRCRAFT WEIGHT AND BALANCE

2.1. General. As more units move by air it becomes extremely important for units to have fully qualified airlift planners. A basic working knowledge of aircraft weight and balance is vital to the planner. Without this knowledge, flight safety is jeopardized and any further airlift planning is meaningless. Airlift is a scarce commodity and must be used efficiently. This chapter explains the basic principle and concepts necessary for the accurate determination of aircraft weight and balance.

2.2. Aircraft Center of Balance (CB). CB is the point where the aircraft balances. Aircraft flight performance depends on the proper location of this point. If the center of balance is not within the allowable range (see fig. 2.1), the aircraft will not fly properly. Additionally, as fuel, oil, cargo, and other weights are added, burned off, or relocated within the aircraft, the CB will change. The aircraft design permits such changes provided the CB location remains within certain specified limits. An empty aircraft is always in balance, regardless of the amount of fuel on board. When adding a cargo load, weight and balance becomes a concern. Each aircraft has a specified forward and aft limitation that must not be exceeded to ensure the aircraft is safely balanced for flight. These limits vary according to the gross weight of the aircraft. The only way to assure a safely balanced aircraft is to know how to find the CB of a load and to determine if it will fall in the proper location on the aircraft.

2.2.1. CB Terms. Computing the CB of an aircraft is similar to the process used for vehicles. A couple of new terms must be defined first:

2.2.1. Reference Datum Line (RDL). A line at or near the aircraft nose. All longitudinal distances are measured from the RDL.

2.2.2. Fuselage Station (FS). Fuselage stations are measurements in inches from the RDL to that specific point in the aircraft. A number on the wall of an aircraft identifies these stations. For example, fuselage station 520 (FS 520) in the aircraft is a point 520 inches aft of the RDL. Use these measurements or distances to determine the location of cargo in the aircraft and for computing the aircraft center of balance.

2.2.3. Moment (M). Amount of force being exerted at a particular point on the Aircraft, often referred to as inch-pounds. Obtain a moment by multiplying the distance (inches from the RDL) by the weight (pounds).

2.2.4. Center of balance (CB). The point at which items balance. This point is measured in inches from the RDL.

2.2.5. Gross weight (GW). The total weight of all cargo, troops and baggage.

2.2.6. Allowable Cabin Load (ACL). The maximum planning weight of cargo that may be transported by a specific aircraft. ACL is limited by several factors: aircraft type, planned flight route and distance, fuel load, weather, airfield location, and runway characteristics.

2.2.7. Mean Aerodynamic Chord. (MAC) Is an engineering term which represents an airfoil's chord in aircraft design. As such, it is a constant length, which is also used in the calculation of cg location in terms of percent MAC.

2.2.8. Percent MAC (% MAC). Percent MAC expresses a location as a percentage of the Mean Aerodynamic Chord (MAC).

2.2.9. Zero Fuel Weight Center of Gravity (ZFW CG). The location at which a loaded aircraft is balanced (excluding fuel) normally expressed in % of MAC. It includes the weight of the aircraft with all equipment, crew, passengers, and cargo, but does not include usable fuel. Load planners must ensure the ZFW CG is within allowable range as determined by aircraft flight manuals.

2.3. Weight and Balance. Airlift users are responsible for efficiently planning their cargo loads prior to aircraft arrival. This means effectively utilizing the ACL in (para. 2.2.6.) and cargo space while balancing the load within the specific aircraft center of balance range. This theory is based upon the aircraft center of balance. The simplest way to explain this is to look at two children of the same weight playing on a seesaw. If both children are the same distance from the center of the board, on opposite sides, the board will be balanced. To balance the board if the children's weights are different; the children must be placed at different distances from the center of the board to allow it to balance.

2.3.1. By moving cargo in relation to the aircraft (CB), we can adjust the balance of the aircraft. The load planner's job is to make sure the load center of balance is within the aircraft center of balance range. To determine the center of balance range, add the total cargo and passenger weights for each aircraft load. Enter the "Cabin Load" column in figure 2.1. and track down the column vertically until you reach the range that your weight falls with-in. Follow the line horizontally across until you are in the vertical column for your type aircraft. The two numbers represent the CB range. Your load center of balance must be between these two numbers.

2.4. Weight Characteristics of Aircraft. Allowable Cabin Load (ACL) is the weight of cargo, baggage, and passengers that may be transported by a specific aircraft. ACL is limited by several factors such as distance, route to be flown, fuel load, weather, and airfield characteristics.

2.4.1. Personnel who prepare load plans must be familiar with the weight limitations of available airlift aircraft and ACL. Accurate ACL information can be derived only from known operating conditions and is normally established at the planning conference or at the time of mission execution. Your affiliated AMCU can provide you with a specific ACL. Airlift personnel compute ACL's and give this information to unit load planners for each operation. Many times, however, load planning needs to be accomplished before the actual mission ACL is known.

AIRCRAFT WEIGHT AND BALANCE

DOD 4500.9-R Part III, Mobility, Defense Transportation Regulation, provides planning ACL's based on average wind factors throughout the world. Use the following figures:

C-130E/H/J(S)	25,000 pounds	C-130J-30	40,000 pounds
C-5A/B	130,000 pounds	C-5M	150,000 pounds
C-17	130,000 pounds		
KC-10	65,200 pounds		

2.5. Aircraft Characteristics. When planning to move by air you must know the physical characteristics of airlift aircraft and your cargo. You must know the size of the cargo door and its location, the size of the cargo compartment, and the location, number, and type of troop seats. You must know the aircraft optimum center of balance and available loading aids (such as ramps, winches, and 463L equipment). Some of these aids are built into the aircraft, some are provided by mobility forces, and the unit to be airlifted must provide some. Also, if assigned, the Air Mobility Liaison Officer (AMLO) can be of some assistance. Because you are not required to maintain a complete file of all Air Force publications, you may require some help from mobility forces for load planning. Consider your affiliated AMCU as an extension of your unit's staff when accomplishing airlift planning.

2.6. Weight and Balance Theories. "Pyramid Loading" and the "50-50" methods are two common weight and balance theories. Look at two children playing on a seesaw. To make it work, they adjust the balance of the board by moving their weight to different distances from the balance point (fulcrum). The same basic principle applies to aircraft weight and balance. By moving cargo in relation to the aircraft fulcrum, we can adjust the balance of an aircraft.

2.6.1. Pyramid Loading Method. Place the heaviest cargo item over the optimum load center of balance. Lighter items are placed in front of and in back of the heaviest item. See figure 2.3.

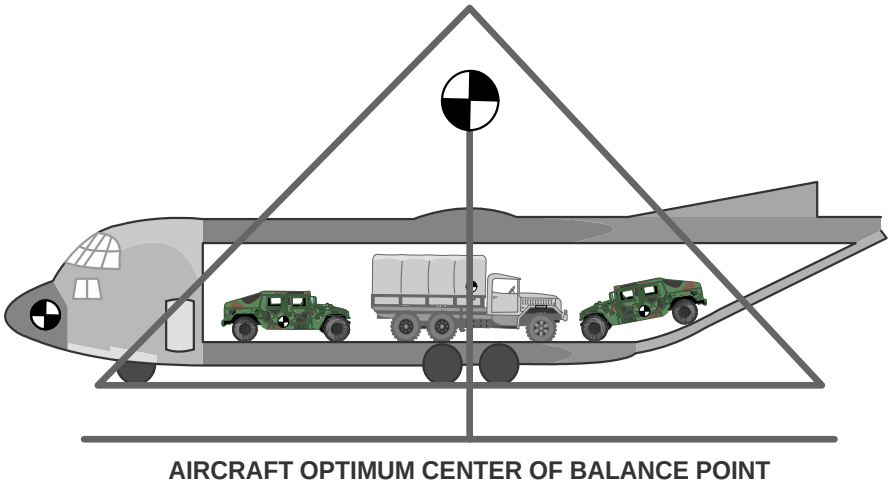

Figure 2.3. Pyramid Loading Method

AIRCRAFT WEIGHT AND BALANCE

2.6.2. 50-50 Method. 50% of the cargo is placed on either side of the optimum cargo load center of balance (see figure 2.4.). As with pyramid loading, heaviest items should be placed as close as possible to the optimum center of balance to reduce stress on the airframe.

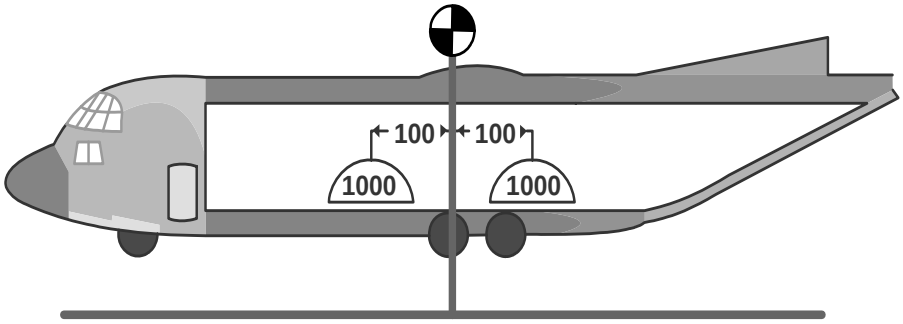

Figure 2.4. 50-50 Loading Method

2.7. Load Planning Theories. There are three key theories to understand during load planning which include **Adding Cargo, Removing Cargo,** and **Shifting Cargo**.

2.7.1. Adding Cargo. When adding cargo, the CG moves toward the added weight.

2.7.2. Removing Cargo. When cargo is removed, the CG moves away from the removed weight.

2.7.3 Shifting Cargo. When shifting cargo, the CG moves in the same direction as the shifted cargo.

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C-130 CHARACTERISTICS

chapter

3

AMC

Lesson Objectives: The objective of this lesson is for each student to apply C-130 load planning characteristics.

References: DOD 4500.9-R Part III, Defense Transportation Regulation (DTR)
1C-130A-9, Cargo Loading Manual
AFI 11-2C-130 Volume 3 Addenda A, C-130 Operations Configurations Mission Planning
1C-130J-9, Cargo Loading Manual
AFI 11-2C-130J Volume 3 Addenda A, C-130 Operations Configurations Mission Planning

Web Pages: http://www.transcom.mil/dtr/part-iii/

Learning Activities:

1. C-130 Hercules
2. Dimensional planning factors
3. Weight/loading considerations
4. Pallet considerations
5. Passenger considerations
6. Configurations
7. C-130J-30 Considerations

Test Objectives:

1. Summarize the roles and missions of the C-130 aircraft
2. Give examples of weight, pallet, and passenger considerations when preparing to load plan a C-130 aircraft
3. Explain the treadway considerations for a C-130 aircraft
4. Describe the different configurations of the C-130 aircraft
5. Denonstrate C-130 load planning computations

C-130 CHARACTERISTICS

3.1. The C-130 Hercules. The C-130 Hercules, designed and built by the Lockheed Corp., (figure 3.1.) has a primary mission of intra-theater (tactical) airlift. It provides airdrop and airland support to forward operating locations. Typical C-130 use would include moving cargo from main theater staging bases (positioned from the United States by larger airlift airplanes or ships) to front line areas. This aircraft is not normally used as an inter-theater (strategic) airlift airplane (i.e., continent to continent airlift). This chapter covers the basic planning factors necessary to prepare for airlift aboard the C-130.

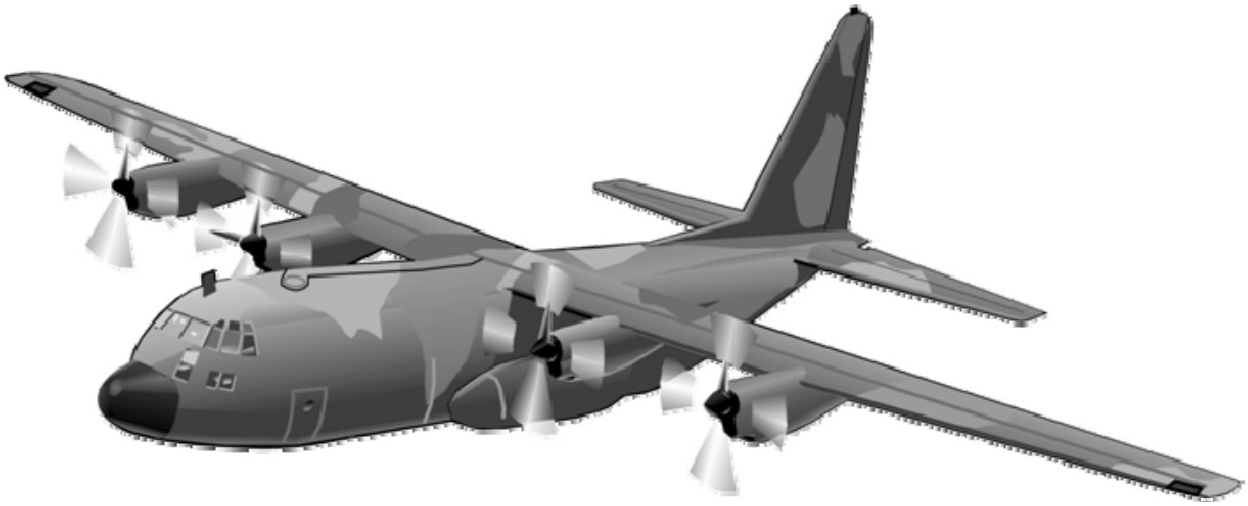


Figure 3.1. C-130 Aircraft

3.2. Dimensional Planning Factors (figure 3.8.). The size of the C-130 allows operation into airfields that prohibit use of larger airlift aircraft (runways normally 5,000 ft. or less). The cargo compartment is 624 inches long (612 inches usable), 123 inches wide (105-inch wide usable floor width with dual rails installed), and 108 inches high. The cargo ramp is 127 inches long and 123 inches wide, (105-inch wide usable floor width with dual rails installed). This cargo compartment cross-section allows the loading of items with a maximum dimension of 106 inches high and 115 inches wide. Under certain circumstances you may exceed these dimensions, but only after coordination with your affiliated AMCU.

3.3. Weight/Loading Considerations. Weight is critical to safe aircraft operation. The load planner must adhere to maximum load weight limitations. Use of the Pyramid Loading Method is also essential to avoid violating aircraft structural limitations. The planning Allowable Cabin Load (ACL) is 25,000 pounds. Heavier loads are possible after coordination with your affiliated AMCU and/or mission planning personnel (618 AOC/XOPF). The cargo compartment has specific weight and height restrictions in different areas. The load planner must consider these limitations when planning cargo placement.

C-130 CHARACTERISTICS

3.4. Vehicles/Non-powered AGE Considerations.

3.4.1. No Load Area. No cargo may be planned between Fuselage Station 245 and 257. Installed aircraft systems prevent cargo from being placed in this area. Cargo will not be placed on the ramp hinge.

3.4.2. Treadways. Two 35-inch wide vehicle treadways extend the length of the cargo floor and ramp. These treadways begin 15-inches from the aircraft centerline. Allowable axle, wheel, and tongue loads are decreased when placed between the treadways.

3.4.3. **Treadway Limits**:

From FS 257-337
Max Axle 6,000 pounds

From FS 337-682
Max Axle 13,000 pounds

From FS 682-737
Max Axle 6,000 pounds

From FS 737-869 (cargo ramp)
Max Axle 2,500 pounds
Max (single axle) may be increased to 3,500 pounds if it is the only item on the ramp.

3.4.4. **Between Treadway Limits:**

From FS 257-737 (on the floor)
Max Axle 5,000 pounds
Max Tongue Load 2,000 pounds

From FS 737-869 (cargo ramp)
Max Axle 1,200 pounds
Max Tongue Load 450 pounds

3.4.5. Wheel weights. Maximum wheel weights are half the maximum axle weight in that area.

3.4.6. Maximum Ramp Weight. The maximum weight planned on the cargo ramp will not exceed 4,664 pounds for C-130E/H, and 5,000 pounds for C-130J(S).

3.4.7. Height restrictions. Vehicles and Non-powered age planned on the cargo floor should be reduced in height to 102 inches. Cargo over 102 inches to 106 inches in height will require special loading procedures. Vehicles over 102” should be driven in, facing forward, or may require approach shoring. Contact your affiliated AMCU for guidance. Vehicles placed on the cargo ramp are limited to 80 inches in height.

C-130 CHARACTERISTICS

3.5. Pallet Considerations. The C-130 can carry six 463L pallets, five on the cargo floor and one on the cargo ramp. Pallet positions are numbered one through six beginning at the front of the aircraft. Each pallet position has specific weight and profile restrictions.

3.5.1. Weight Limitations. The maximum gross weight of a pallet placed in positions one through four is 10,355 pounds. The maximum gross weight of a pallet placed in position five is 8,500 pounds. The maximum gross weight of a pallet placed on the ramp (position six) is 4,664 pounds on C-130E/H, and 5,000 pounds on C-130J(S).

3.5.2. Pallet Profiles.

3.5.2.1 Pallet Position One. Cargo may be loaded over the entire usable surface of the pallet up to 76 inches in height. Any cargo above 76 inches up to 96 inches high must be placed 12 inches inboard from the edge of the usable surface of the pallet. This restriction could be on either or both sides of the pallet depending on the aircraft model. This will prevent the cargo from striking the aircraft overhead equipment rack(s). (See figure 3.2.) Due to numerous C-130 configurations, contact affiliated AMCU for specific info."

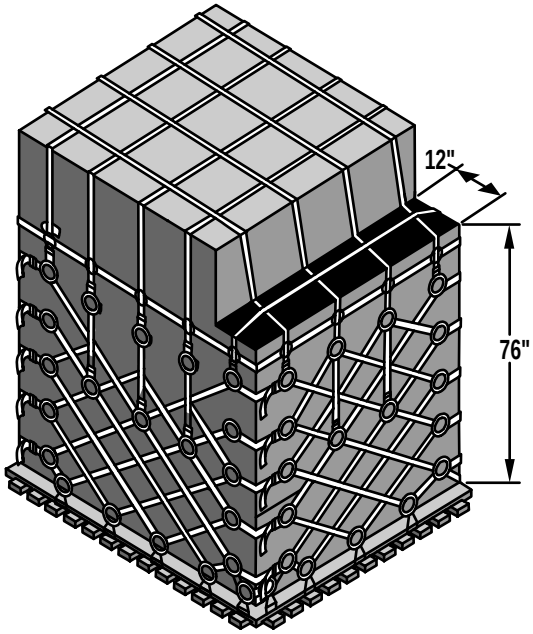


Figure 3.2. Pallet Profile (Pallet Position 1)

3.5.2.2. Pallet Position Two. Cargo may be loaded over the entire usable surface of the pallet up to 96 inches high.

3.5.2.3. Pallet Position Three and Four. Cargo may be stacked up to 96 inches high. Cargo must be stacked at least six inches from the edge of the usable surface on one 88-inch side. This will allow access to the rear of the cargo compartment through the wheel well area. (See figure 3.3.)

C-130 CHARACTERISTICS

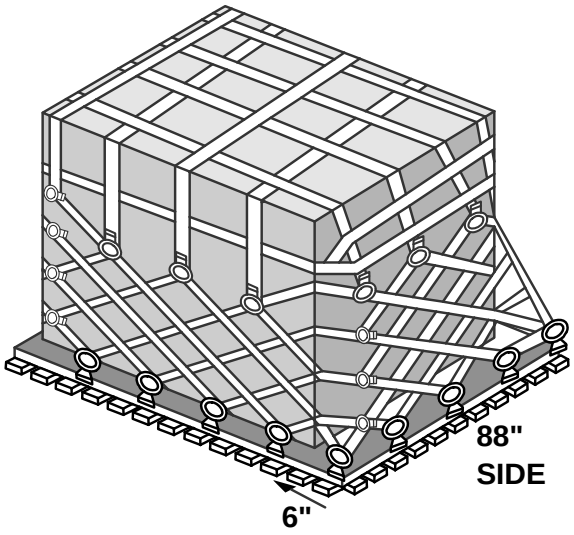


Figure 3.3. Pallet Profile Aisleway (Pallet Positions 3 & 4)

3.5.2.4. Pallet Position Five. Cargo may be loaded over the entire usable surface of the pallet up to 96 inches high.

3.5.2.5. Ramp Pallet (Position 6). Cargo must be stacked at least 20 inches in from the edge of the usable surface on one 88-inch side. This will allow access to the rear emergency exits. Cargo may be stacked up to 76 inches high. (See figure 3.4.)

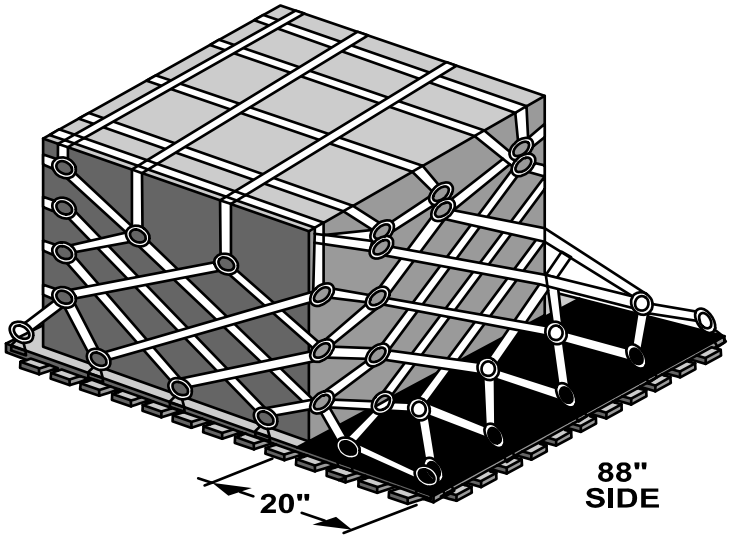


Figure 3.4. Pallet Profile Aisleway (Pallet Position 6)

3.6. Passenger Considerations. A maximum of 90 passengers can be carried over land. A maximum of 74 passengers can be carried over water based on life raft availability. See chapter 2 for standard passenger planning weights.

3.6.1. Passenger seating with Palletized Cargo. Passengers will not be seated closer

than 30 inches forward of netted or strapped cargo. Passengers cannot be seated beside palletized cargo.3.6.2. **Passenger seating next to Non-palletized Cargo outside the aircraft wheel well area.**

3.6.2.1. Cargo widths 76 inches or less. Centerline cargo and seat passengers on both sides of the cargo compartment.

3.6.2.2. Cargo widths between 76 inches to 96 inches. Seat passengers only on one side of the cargo compartment. Whenever possible, cargo will be offset to the right and pas-sengers will be offset to the left.

3.6.2.3. Cargo widths greater than 96 inches. No passengers beside cargo.

3.6.3. **Passenger seating next to Non-palletized Cargo in the aircraft wheel well area.**

3.6.3.1. Cargo widths 52 inches or less. Centerline cargo and seat passengers on both sides of the cargo compartment.

3.6.3.2. Cargo widths between 52 inches to 72 inches. Offset cargo and seat passengers on opposite side.

3.6.3.3. Cargo widths greater than 72 inches. No passengers beside cargo.

3.6.3.4. Loadmaster requirements. One loadmaster will always be seated in the cargo compartment when passengers are carried. Two loadmasters are required when more than 40 passengers are carried. The number of seats required for the loadmasters will reduce passenger seating.

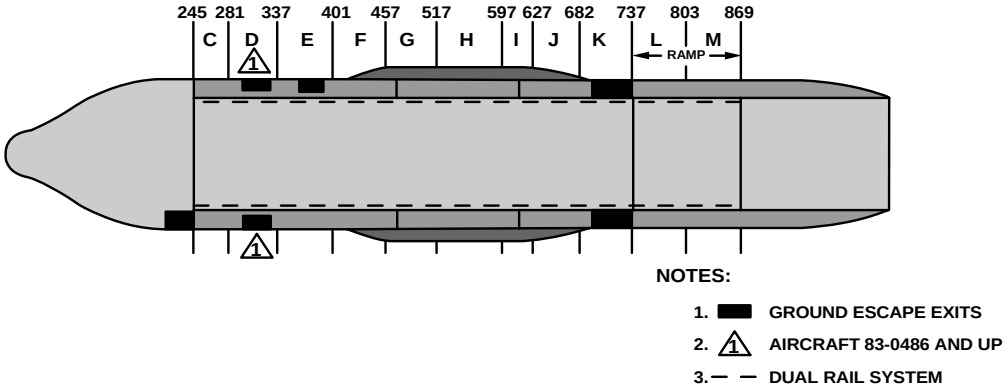
3.7. Configurations. Standard cargo compartment configurations are designed to ensure aircraft arrive at the airfield prepared to immediately load the equipment and personnel. The load planner must select the proper configuration code to avoid loading delays. Figures 3.5. through 3.7. depict three of the most common deployment configurations. Refer to AFI 11-2C-130 Vol 3 Addenda A and AFI 11-2C-130J V3 Addenda A for detailed configuration information and modifications. **NOTE:** Load planners will typically utilize the Standard Air Land (STD AL) configuration when creating load plans with ICODES software.

3.8. Load Planning Factors. Air Mobility Command (AMC) instituted a fuel efficiency initiative to optimize fuel usage. Mission planners will manage aviation fuel as a limited commodity and precious resource. Fuel optimization will be considered throughout all phases of mission planning.

3.8.1. Optimum ZFW CG. C-130 aircraft will be load planned to 20% - 22% Mean Aerodynamic Chord (MAC) unless specific loading instructions dictate otherwise.

C-130 CHARACTERISTICS

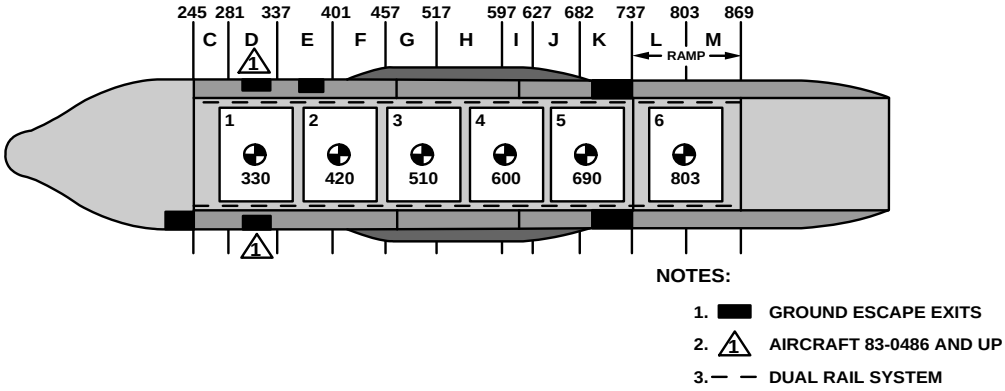
3.7.1. **C-1.** Clear floor for rolling stock with 30 permanently installed sidewall seats available.



NOTES:
1. GROUND ESCAPE EXITS
2. 1 AIRCRAFT 83-0486 AND UP
3. — — DUAL RAIL SYSTEM

Figure 3.5. Configuration C-1

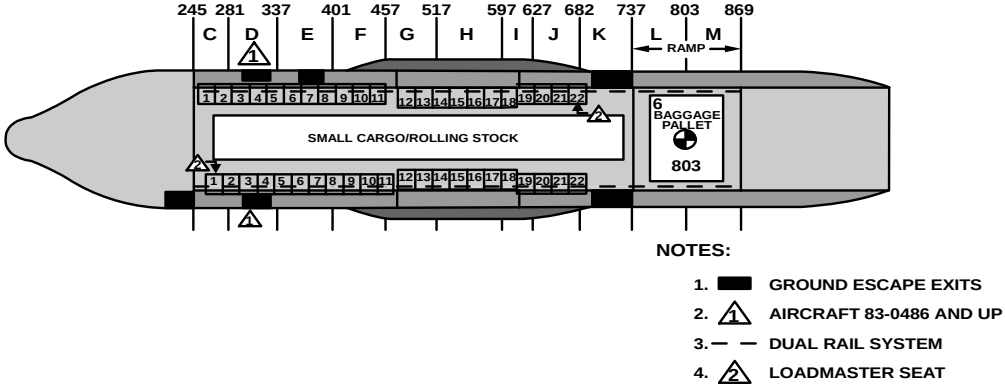
3.7.2. **C-2.** Roller conveyors installed. Six pallets and no passengers. Sidewall seats may be available if less than six pallets are loaded.



NOTES:
1. GROUND ESCAPE EXITS
2. 1 AIRCRAFT 83-0486 AND UP
3. — — DUAL RAIL SYSTEM

Figure 3.6. Configuration C-2

3.7.3. **CP-1.** Forty-four sidewall seats installed with a baggage pallet on the ramp. Non-palletized cargo can be loaded on the cargo floor IAW paragraph 3.4.



NOTES:
1. GROUND ESCAPE EXITS
2. 1 AIRCRAFT 83-0486 AND UP
3. — — DUAL RAIL SYSTEM
4. 2 LOADMASTER SEAT

Figure 3.7. Configuration CP-1

C-130 CHARACTERISTICS

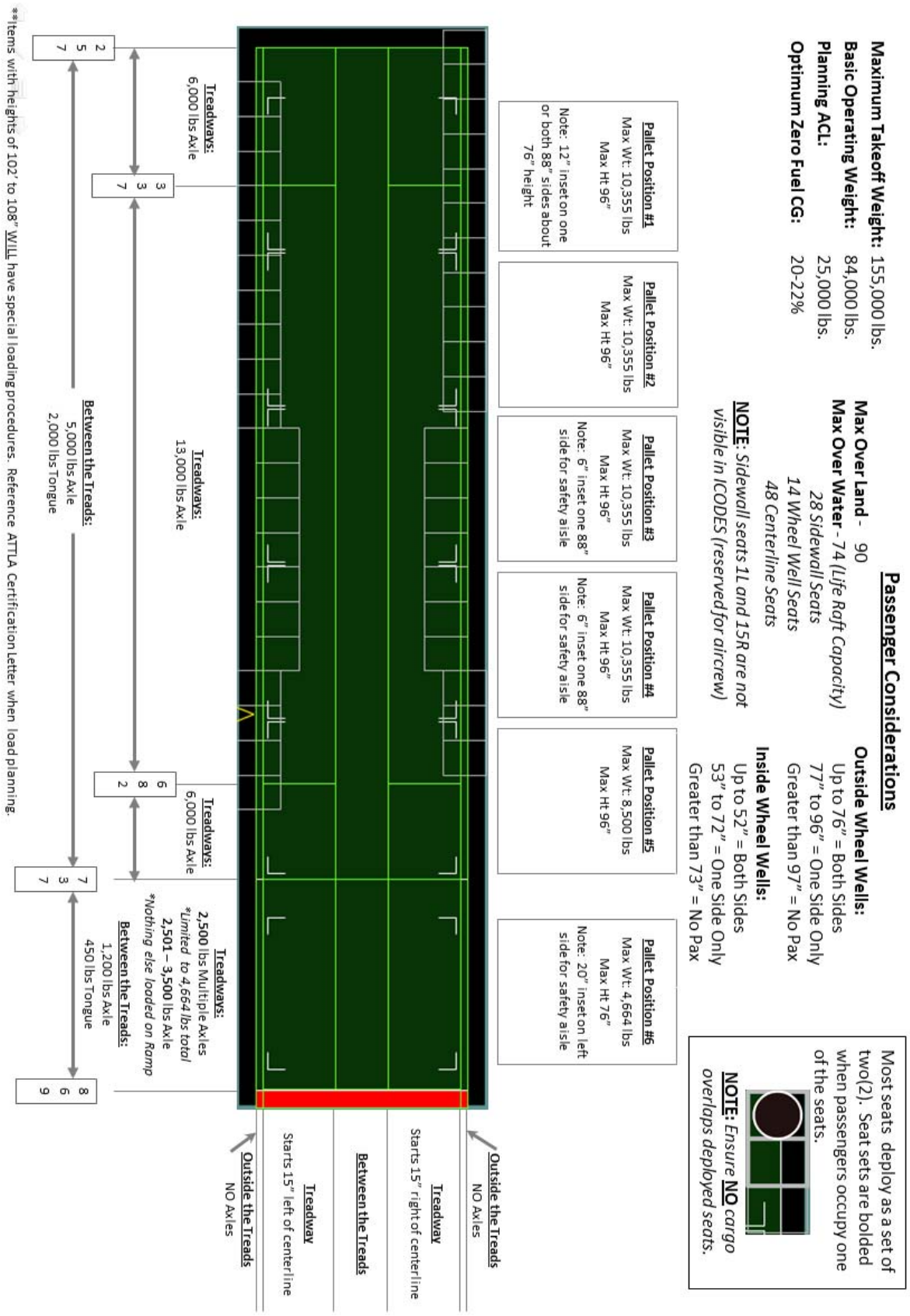


Figure 3.8. C-130E/H Floor Schematic

C-130 CHARACTERISTICS

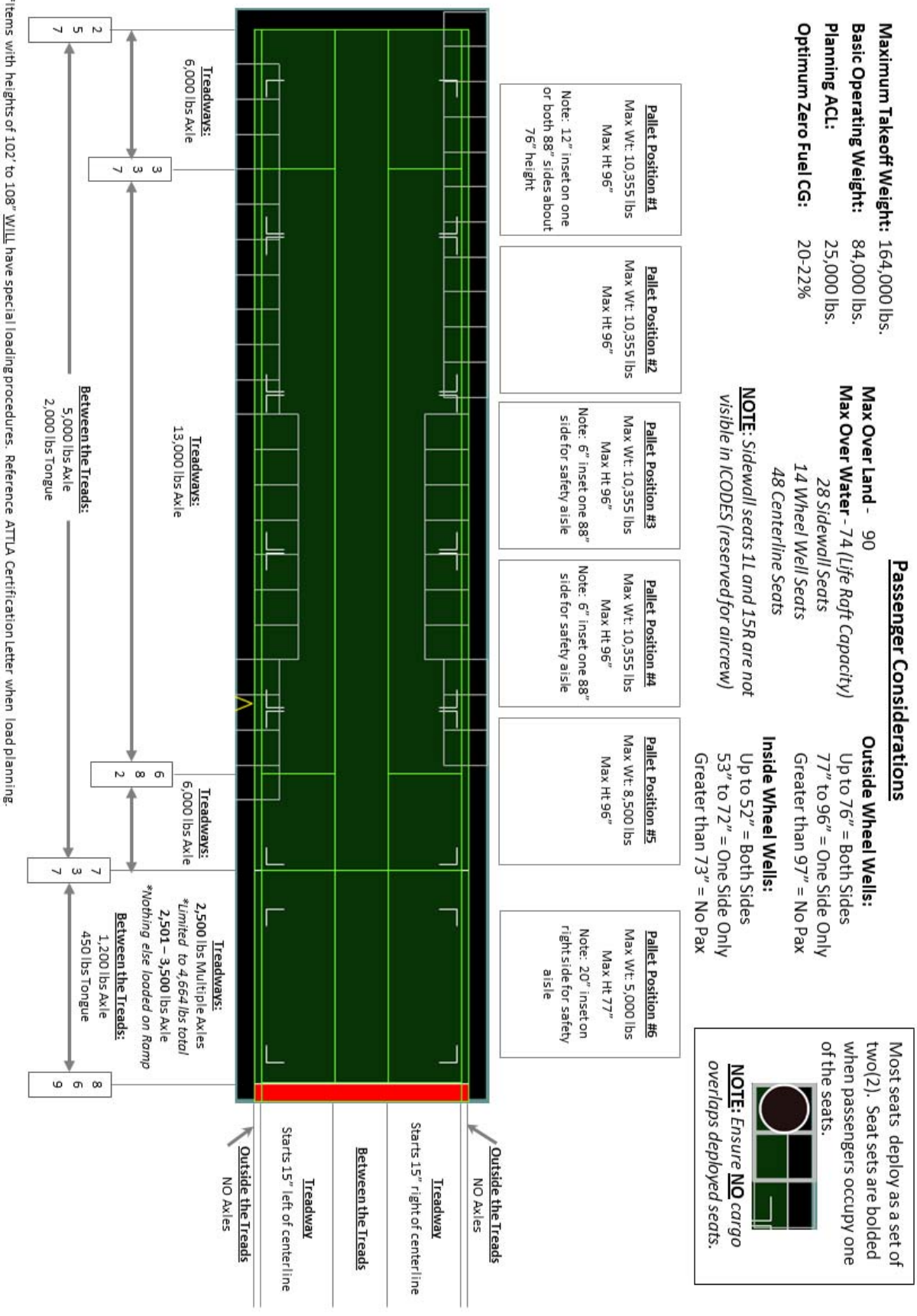


Figure 3.9. C-130J(S) Floor Schematic

C-130 CHARACTERISTICS

3.8 C-130J-30 Dimensional Planning Factors. There are multiple versions of the C-130J aircraft. We previously discussed C-130J(S) (Short) aircraft differences along with C-130E/H characteristics. We will now focus on the C-130J-30 series aircraft. The -30 C-130J aircraft are made longer than the standard C-130J series aircraft by the addition of two fuselage plugs making the aircraft 15 ft. longer than the standard C-130J. The forward plug is installed at the forward cargo bulkhead and is 100 inches long. The aft plug is 80 inches long and is installed just aft of the paratroop doors. The -30 version has interior markings identified as load stations (LS) rather than fuselage stations. The -30 aircraft RDL is also 100 inches farther forward than the standard C-130J which alters the LS by 100 inches. The cargo compartment is 672 inches long, 125 inches wide, (between LS 832 and LS 1011 you may increase the width of cargo to 164 inches wide above 54 inches from cargo floor), and 108 inches high at its lowest point under the wing section. You are limited to 80 inches wide 72 inches and above with a maximum height of 100 inches if the paratroop doors are opened in flight. The cargo floor area extends from LS 345 to LS 1017. The cargo ramp is 119.9 inches long (124.6 with forward and aft bulkhead installations included), and 118.9 inches wide (112.3 at the aft end of the ramp between the curb assemblies). This cargo compartment cross-section allows the loading of items with a maximum dimension of 106 inches high and 114.75 inches wide. Under certain circumstances you may exceed these dimensions, but only after coordination with your affiliated AMCU.

3.9. Weight/Loading Considerations. Weight is critical to safe aircraft operation. The load planner must adhere to maximum load weight limitations. Use of the Pyramid Loading Method is essential to avoid violating aircraft structural limitations. The peacetime ACL (Allowable Cabin Load) based on 2,500 NM for a C-130 is 25,000 pounds; the wartime ACL based on 1,175 NM is 36,000 pounds. The C-130 does not have a separate passenger compartment, and passengers compete for available ACL. Heavier loads are possible when permitted after coordination with your affiliated AMCU and/or mission planning personnel (618 AOC/XOPF). The cargo compartment has specific weight and height restrictions in different areas. The load planner must consider these limitations when planning cargo placement.

3.9.1 Bending Moments. Due to the added length of the C-130J-30, it has unique limitations regarding weight placement forward and aft of the wing area. Weight placed in these areas exerts a bending force on the aircraft structure measured in units referred to as bending moments. Due to forces encountered in flight, strict adherence to bending moment limitations is necessary to prevent aircraft structural damage. The Aircraft Commander has final authority to accept/reject any or all cargo if the planned load is not within bending moment limits. As mentioned earlier, use of the Pyramid Loading Method (heaviest item placed at ideal CB) is essential. For more information regarding this limitation, contact your affiliated AMCU.

C-130 CHARACTERISTICS

3.10. Vehicles/Non-powered AGE Considerations.

3.10.1. Treadways. Two 35-inch wide vehicle treadways extend the length of the cargo floor and ramp. These treadways begin 15-inches from the aircraft centerline. Allowable axle, wheel, and tongue loads are decreased when placed between the treadways.

3.10.2. **Treadway Limits**:

From LS 345 - 537	
Max Axle	6,000 pounds
From LS 537 - 882	
Max Axle	13,000 pounds
From LS 882 - 1017	
Max Axle	6,000 pounds
From LS 1017 - 1141 (cargo ramp)	
Max Axle	2,500 pounds

Max (single axle) may be increased to 3,500 pounds if it is the only item on the ramp.

3.10.3. **Between Treadway Limits:**

From LS 345 - 1017 (on the floor)	
Max Axle	5,000 pounds
Max Tongue Load	2,000 pounds
From LS 1017 - 1141 (cargo ramp)	
Max Axle	1,200 pounds
Max Tongue Load	450 pounds

3.10.4. Wheel weights. Maximum wheel weights are half the maximum axle weight in that area.

3.10.5. Maximum Ramp Weight. The maximum weight planned on the cargo ramp will not exceed 5,000 pounds.

3.10.6. Height restrictions. Vehicles and Non-powered age planned on the cargo floor should be reduced in height to 102 inches. Cargo over 102 inches to 106 inches in height will require special loading procedures. Vehicles over 102 inches should be driven in facing forward, or may need approach shoring. Contact your affiliated AMCU for guidance. Vehicles placed on the cargo ramp are limited to 80 inches in height.

3.11 Pallet Considerations. The C-130J-30 can carry eight 463L pallets, seven on the cargo floor and one on the cargo ramp. Pallet positions are numbered one through eight beginning at the front of the aircraft. Each pallet position has specific weight and profile restrictions.

C-130 CHARACTERISTICS

3.11.1. **Weight Limitations.** The maximum gross weight of a pallet placed in positions one through six is 10,355 pounds. Pallet position seven is limited to 8,500 pounds. The maximum gross weight of a pallet placed on the ramp (position eight) is 5,000 pounds.

3.12.2. **Pallet Profiles.**

3.12.2.1. Pallet Position One, Two, and Three. Cargo may be loaded over the entire usable surface of the pallet up to 76 inches in height. Any cargo above 76 inches up to 96 inches high must be placed 12 inches inboard from the edge of the usable surface of the pallet. This restriction could be on either or both sides of the pallet depending on the aircraft model.

3.12.2.2. Pallet Positions Four & Five. Cargo may be stacked up to 96 inches high. Cargo must be stacked at least six inches from the edge of the usable surface on one 88-inch side. This will allow access to the rear of the cargo compartment through the wheel well area.

3.12.2.3. Pallet Positions Six & Seven. Cargo may be loaded over the entire usable surface of the pallet up to 96 inches in height.

3.12.2.4. Ramp Pallet (Position Eight). Cargo must be stacked at least 20 inches in from the edge of the usable surface on one 88-inch side. This will allow access to the rear emergency exits. Cargo may be stacked up to 77 inches high.

3.13. Passenger Considerations. A maximum of 126 passengers can be carried. See chapter 2 for standard passenger planning weights.

3.13.1. Passenger seating with Palletized Cargo. Passengers will not be seated closer than 30 inches forward of netted or strapped cargo. Passengers cannot be seated beside palletized cargo.

3.13.2. **Passenger seating next to Non-palletized Cargo outside the aircraft wheel well area.**

3.13.2.1. Cargo widths 76 inches or less. Centerline cargo and seat passengers on both sides of the cargo compartment.

3.13.2.2. Cargo widths between 76 inches to 96 inches. Seat passengers only on one side of the cargo compartment. Whenever possible, cargo will be offset to the right and passengers will be offset to the left.

3.13.2.3. Cargo widths greater than 96 inches. No passengers beside cargo.

3.13.3. **Passenger seating next to Non-palletized Cargo in the aircraft wheel well area.**

C-130 CHARACTERISTICS

3.13.3.1. Cargo widths 52 inches or less. Centerline cargo and seat passengers on both sides of the cargo compartment.

3.13.3.2. Cargo widths between 52 inches to 72 inches. Offset cargo and seat passengers on opposite side.

3.13.3.3. Cargo widths greater than 72 inches. No passengers beside cargo.

3.13.3.4. Loadmaster requirements. One loadmaster will always be seated in the cargo compartment when passengers are carried. Two loadmasters are required when more than 40 passengers are carried. The number of seats required for the loadmasters will reduce passenger seating.

3.14. Configurations. Standard cargo compartment configurations are designed to ensure aircraft arrive at the airfield prepared to immediately load the equipment and personnel. The load planner must select the proper configuration code to avoid loading delays. Figures 3.9. through 3.11. depict three of the most common deployment configurations. Refer to AFI 11-2C-130V3 Addenda A for detailed configuration information and modifications. **NOTE:** Load planners will typically utilize the Standard Air Land (STD AL) configuration when creating load plans with ICODES software.

3.14.1. **C-1.** Clear floor for rolling stock with 48 permanently installed sidewall seats.

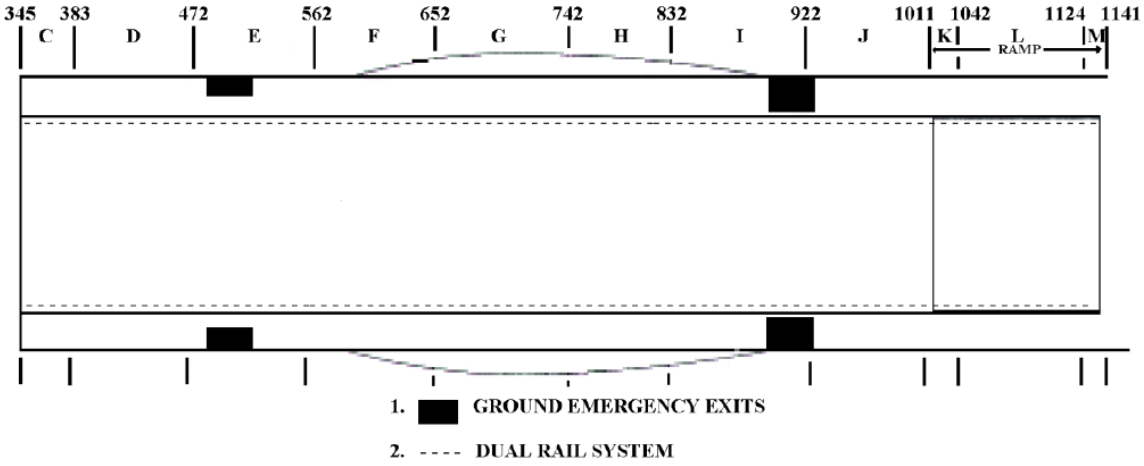


Figure 3.9. C-130J-30 Configuration C-1

C-130 CHARACTERISTICS

3.14.2. **C-2.** Roller conveyors installed. Eight pallets and no passengers. Sidewall seats may be available if less than eight pallets are loaded.

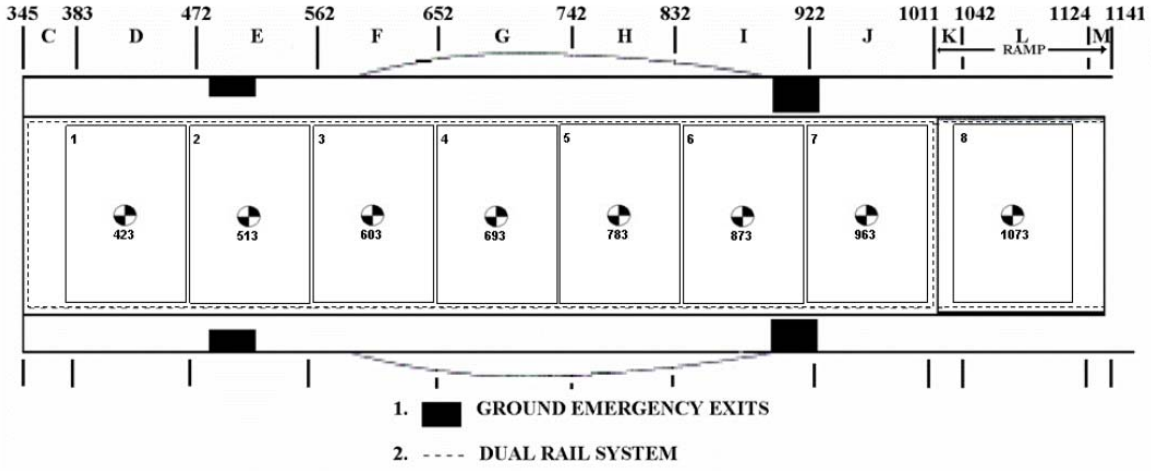


Figure 3.10. C-130J-30 Configuration C-2

3.14.3. **CP-1.** Sixty-Two sidewall seats installed with a baggage pallet on the ramp. Non-palletized cargo can be loaded on the cargo floor IAW paragraph 3.10.

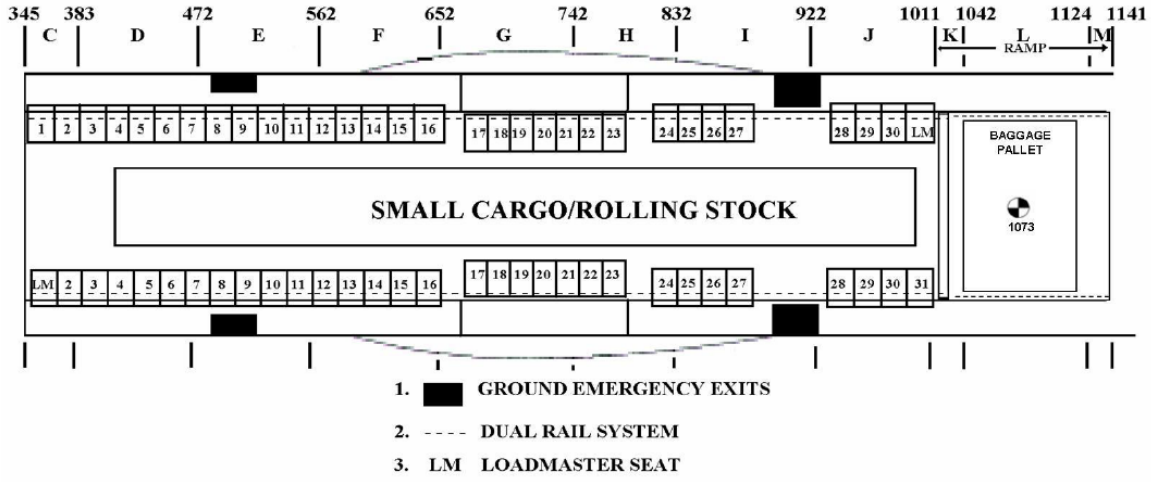


Figure 3.11. C-130J-30 Configuration CP-1

3.15. Load Planning Factors. Air Mobility Command (AMC) instituted a fuel efficiency initiative to optimize fuel usage. Mission planners will manage aviation fuel as a limited commodity and precious resource. Fuel optimization will be considered throughout all phases of mission planning.

3.15.1. Optimum ZFW CG. C-130 aircraft will be load planned to 20% - 22% Mean Aerodynamic Chord (MAC) unless specific loading instructions dictate otherwise.

C-130 CHARACTERISTICS

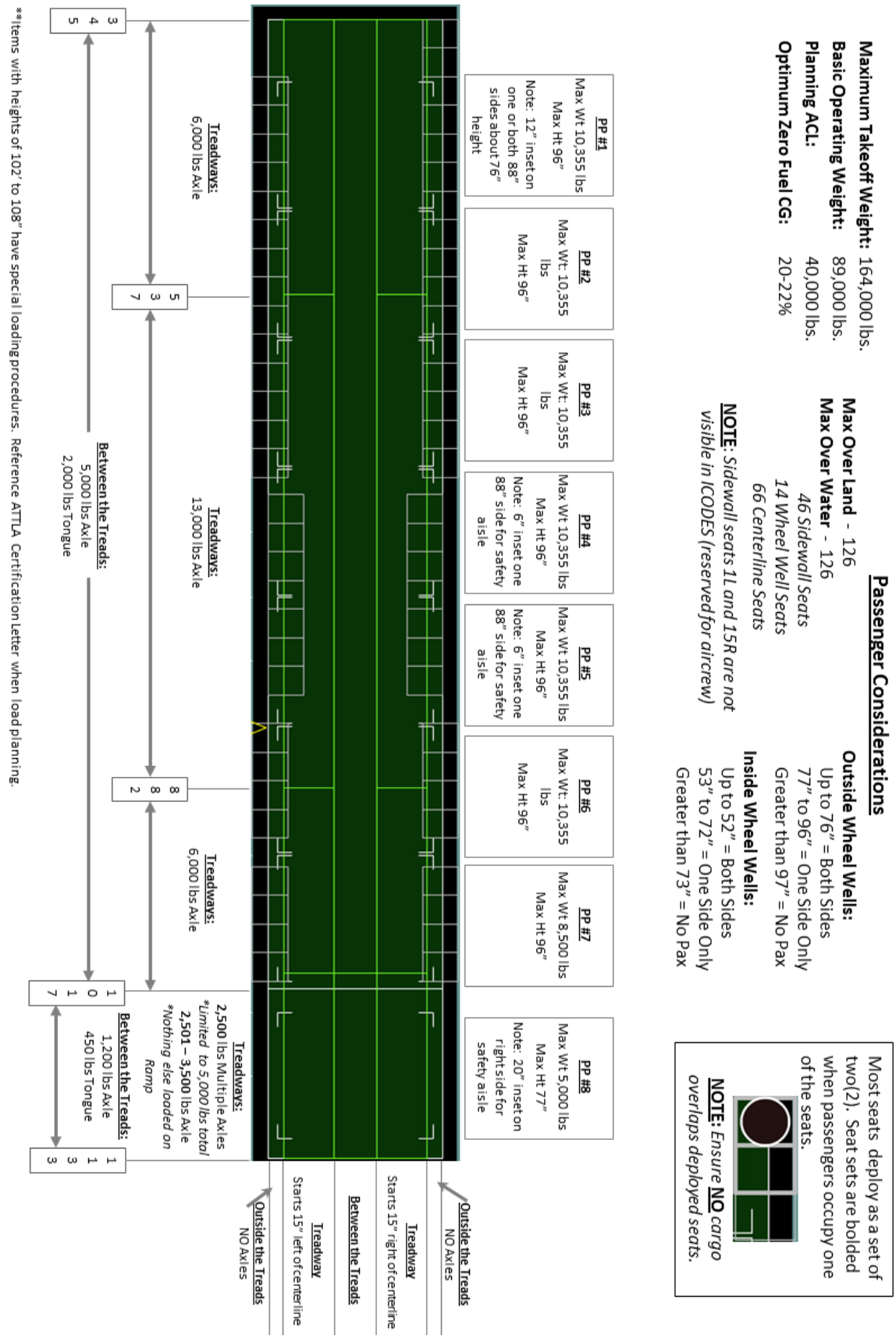


Figure 3.12. C-130J-30 Floor Schematic

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C-5 CHARACTERISTICS

chapter

4

AMC

Lesson Objectives: The objective of this lesson is for each student to apply C-5 load planning characteristics.

References: DOD 4500.9-R Part III, Defense Transportation Regulation (DTR)
1C-5A-9, Loading Instructions
AFI 11-2C-5 Volume 3 Addenda A, Configurations/Mission Planning
AMCI 24-101 Volume 11 Cargo and Mail Policy

Web Pages: http://www.transcom.mil/dtr/part-iii/

Learning Activities:

1. C-5 Galaxy
2. Dimensional planning factors
3. Weight/loading considerations
4. Pallet considerations
5. Passenger considerations
6. Configurations

Test Objectives:

1. Summarize the roles and missions of the C-5 aircraft
2. Give examples of weight, pallet, and passenger considerations when preparing to load plan a C-5 aircraft
3. Explain what must be considered when loading items side-by-side on a C-5 aircraft
4. Describe the different configurations of the C-5 aircraft
5. Demonstrate C-5 load planning computations

C-5 CHARACTERISTICS

4.1. The C-5 Galaxy. The C-5 Galaxy aircraft (figure 4.1.) was designed for the primary mission of inter-theater (strategic) airlift of outsized cargo. A typical example of effective C-5 use is to move outsized cargo such as large helicopters, tanks, and communication vans. This chapter explains the basic planning factors necessary to prepare for airlift aboard the C-5.

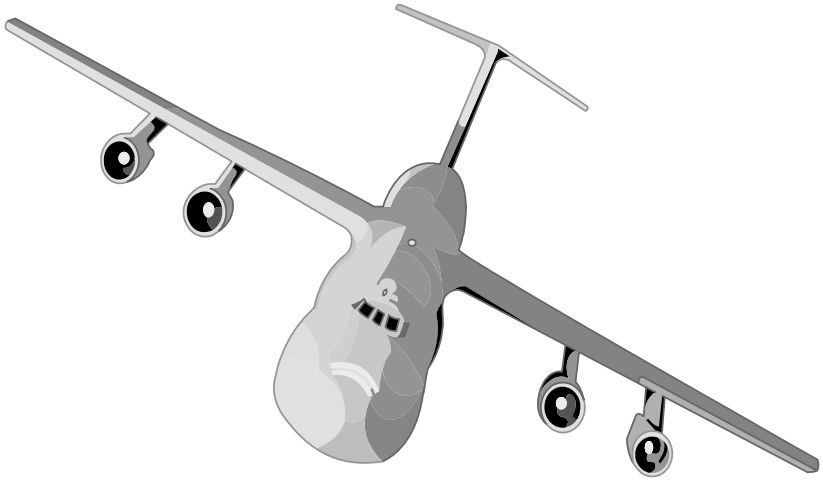

Figure 4.1. C-5 Aircraft

4.2. Dimensional Planning Factors (figure 4.16.). The C-5 is the largest US airlift aircraft. Its size allows it to carry cargo that will not fit into any other airlift aircraft. The cargo compartment is 1736 inches long, 228 inches wide and 162 inches high. The C-5 employs the use of two cargo loading ramps. The forward ramp is 122 inches long and 228 inches wide, and the aft ramp is 155 inches long and 228 inches wide.

4.3. C-5 Weight/Loading Considerations. As with all aircraft, weight limitations are absolutely critical to flight. The normal planning ACL for the C-5A/B is 130,000 lbs. and 150,000 lbs. for the C-5M, but you must adhere to the C-5's specific weight limitations (figure 4.16.). Specific weight restrictions apply to the cargo compartment floor. Restrict cargo between fuselage stations 395 to 517 and FS 1971 to FS 2131 (aircraft ramps) to 3,600 lbs. maximum weight in any 20-inch length. Fuselage stations 517 to 724 and FS 1884 to FS 1971 are restricted to 20,000 lbs. in any 40" length. Fuselage stations 724 to 1458 and FS 1518 to FS 1884 are restricted to maximum weights of 36,000 lbs. in any 40-inch length. Limit fuselage stations 1458 to 1518 to no greater than 25,000 lbs. combined maximum weight of concentrated cargo and vehicles with axles.

NOTE: Side-by-side, multiple wheeled vehicle axles and concentrated cargo loaded between FS 1458 and FS 1518 are limited to a combined maximum weight of 25,000 pounds. Tracked vehicles are excluded from this restriction.

C-5 CHARACTERISTICS

4.4. Vehicles/Non-powered AGE Considerations.

4.4.1. C-5 Side-by-Side Loading. The large size of the C-5 will allow side-by-side loading of many items of cargo. Due to the many factors impacting cargo loading, ATTLA certification letters may not specifically address the ability of each item to be loaded beside another. Because the C-5 cargo compartment is arched rather than square (Figure 4.2.), items greater than 114 inches in height and/or 96 inches in width may need special consideration to determine if the items of cargo will fit side-by-side.

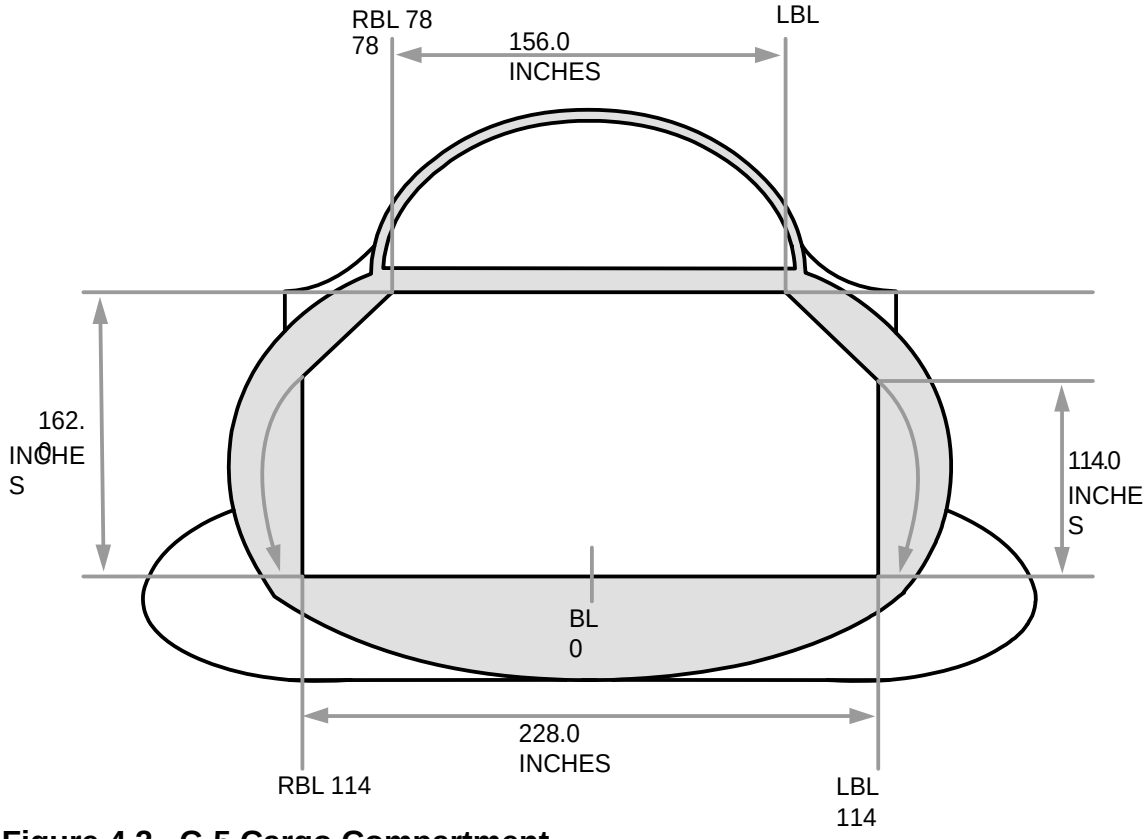

Figure 4.2. C-5 Cargo Compartment

Profile

4.4.2. Cryogenic Support Equipment. The C-5 is equipped with three cryogenic vents on the left side of the cargo compartment at Fuselage Stations (FS) 734, 1219, and 1779 for inflight venting of cryogenic support equipment (i.e. nitrogen/LOX carts). These locations are indicated by triangles on the left side of Figure 4.10. and also by blue triangles on the bottom of aircraft diagrams in ICODES.

C-5 CHARACTERISTICS

4.5. Pallet Considerations. The C-5 can carry a maximum of 36, 463L pallets. Pallet positions number 1, 2, 35, and 36 (aircraft ramps) may carry pallets up to 7,500 pounds each. Pallet positions 3 through 34 can carry pallets up to 10,355 pounds each. Three pallet profiles are used on the C-5.

4.5.1 Pallet positions 1 and 2. Palletized cargo placement is restricted to 90 inches wide, 84 inches long, and 96 inches high. This leaves a 14-inch aisleway on the outboard edge of each pallet (figure 4.4.).

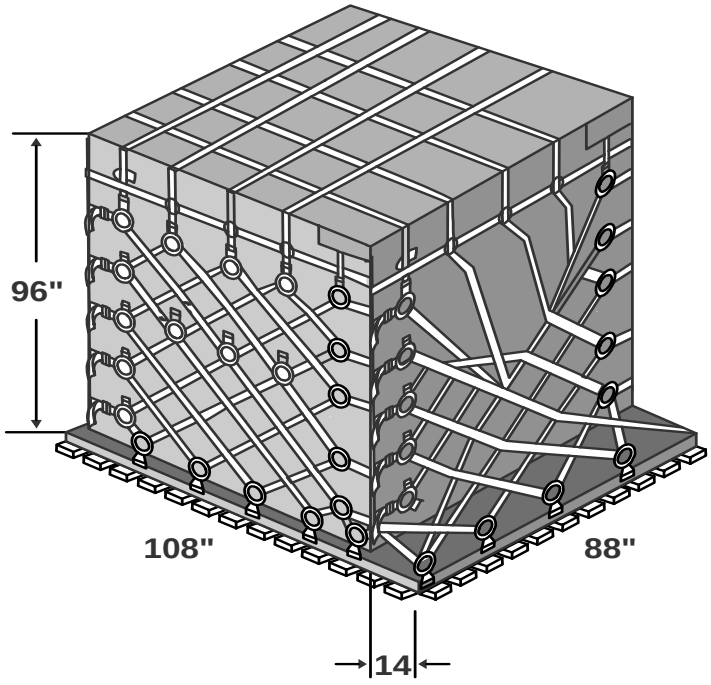

Figure 4.4. C-5 Pallet Profile, Pallet Positions #1 and #2

4.5.2. Pallet positions 3 through 34 can carry pallets up to 104 inches wide, 84 inches long, and 96 inches high.

4.5.3. Pallet positions 35 and 36. Palletized cargo placement is restricted to 90 inches wide, 84 inches long and 70 inches high. This provides a 14-inch aisleways on the outboard edge of each pallet (figure 4.5.).

C-5 CHARACTERISTICS

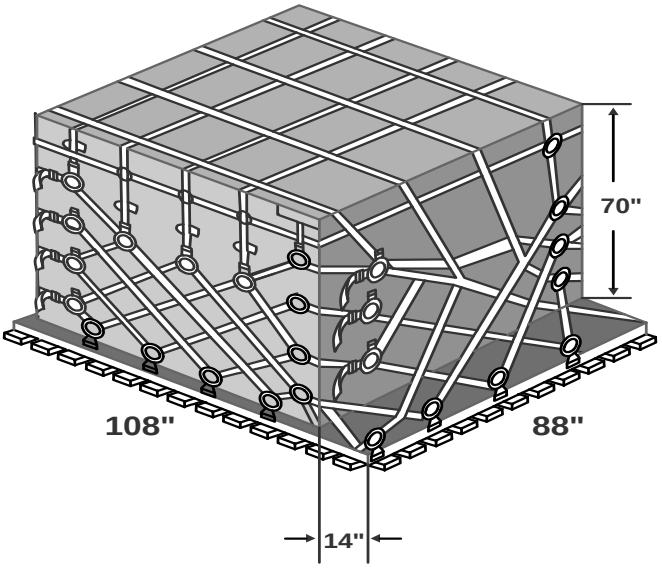

Figure 4.5. C-5 Pallet Profile, Pallet Positions #35 and #36

4.6. C-5 Configurations. There are two standard and one mixed configuration on the C-5. CP-1 and CP-2 configurations are shown in figures 4.6. and 4.7. The CP-3 configuration is a combination of CP-1 & CP-2. CP-3 provides a mixed combination of palletized cargo, floor loaded cargo and/or rolling items with seats for 73 passengers in the troop compartment. Modifications must be with concurrence of your affiliated AMCU.

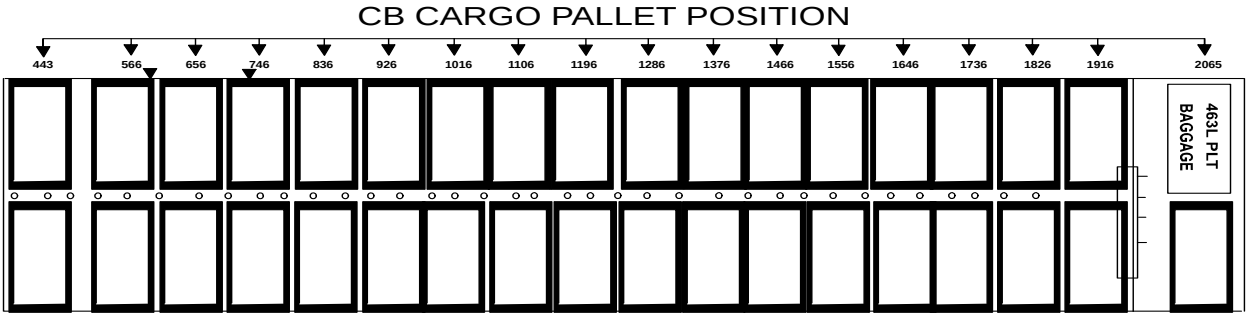

Figure 4.6. C-5 Configuration, CP-1

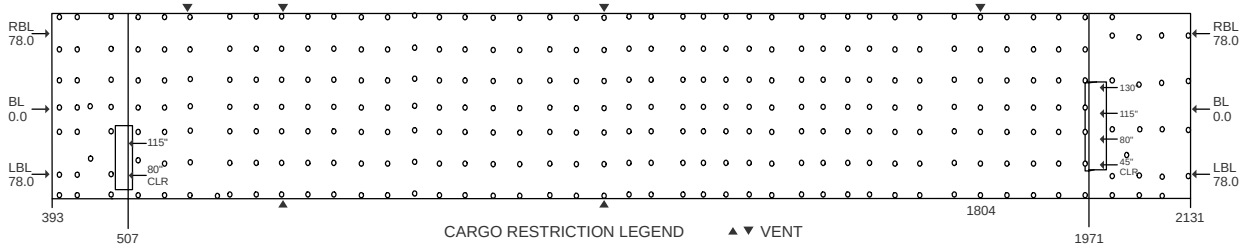

Figure 4.7. C-5 Configuration, CP-2

Note: *CP-3. Provides a mixed combination of palletized cargo, floor-loaded cargo and/or rolling items with seats for 73 passengers in the troop compartment. When 20 or more passenger/troops are planned, baggage should be palletized.*

C-5 CHARACTERISTICS

4.7. Passenger Consideration. The C-5 has a separate passenger compartment above the cargo compartment (figure 4.8.) providing seats for seventy-three passengers without affecting cargo loading. The upper troop compartment planning fuselage station is always fuselage station 1675. (figure 4.9.).

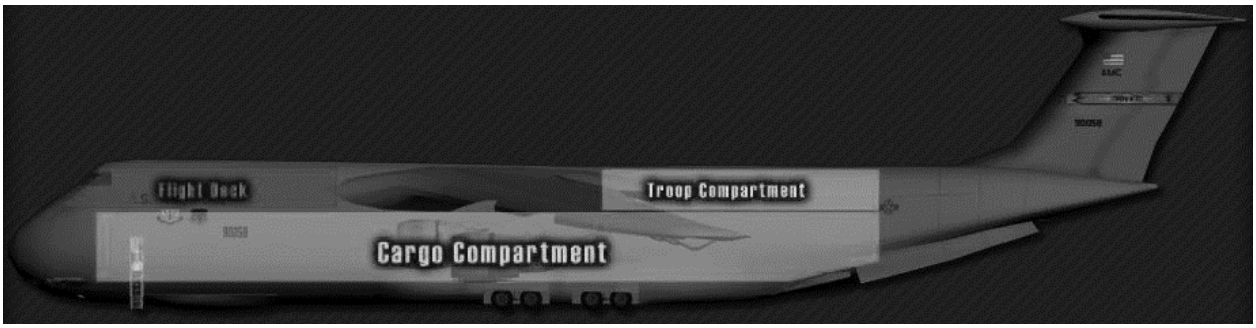

Figure 4.8. C-5 Troop Compartment Location

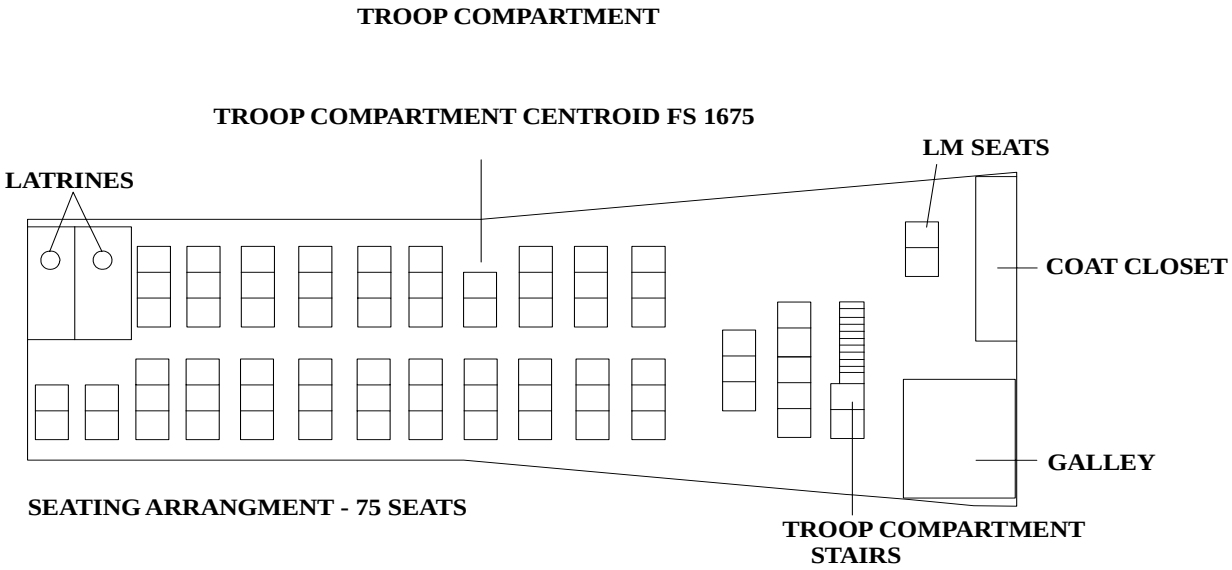

Figure 4.9. C-5 Troop Compartment Seating (73 seats available for user)

4.8. Load Planning Factors. Air Mobility Command (AMC) instituted a fuel efficiency initiative to optimize fuel usage. Mission planners will manage aviation fuel as a limited commodity and precious resource. Fuel optimization will be considered throughout all phases of mission planning.

4.8.1. Optimum ZFW CG. C-5 aircraft will be load planned to **38%** Mean Aerodynamic Chord (MAC) unless specific loading instructions dictate otherwise. **36%** will be used if passengers/bags are not included (CB will shift aft when they are added).

C-5 CHARACTERISTICS

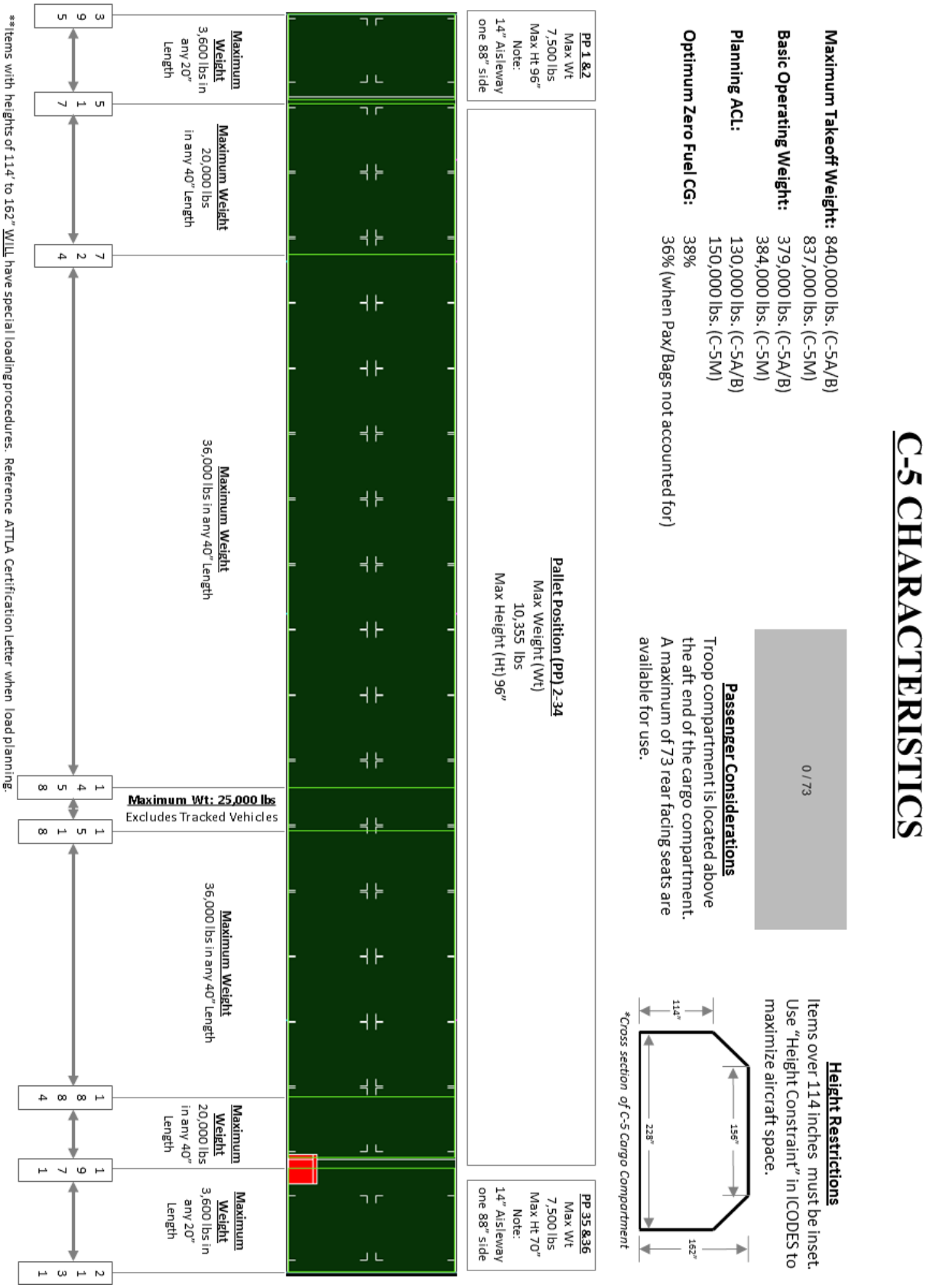

Figure 4.10. C-5 Floor Schematic

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C-17 CHARACTERISTICS

chapter

5

AMC

Lesson Objectives: The objective of this lesson is for each student to apply C-17 load planning characteristics.

References: AFI 24-103 AMC Cargo Load Planning Template System
DOD 4500.9-R Part III, Defense Transportation Regulation (DTR)
T.O.1C-17A-9, Cargo Loading Manual
AFI 11-2C-17 Volume 3 Addenda A
AMCI 24-101 Volume 11

Web Pages: http://www.transcom.mil/dtr/dtrHome/

Learning Activities:

1. C-17 Globemaster III
2. Dimensional planning factors
3. Weight/loading considerations
4. Pallet considerations
5. Passenger considerations
6. Configurations

Test Objectives:

1. Describe the mission and the capabilities of the C-17 aircraft.
2. Give examples of weight, pallet, an passenger considerations when preparing to load plan a C-17 aircraft.
3. Demonstrate load planning procedures for side-by-side vehicle loading.
4. Distinguish between the different configurations for the C-17 aircraft.
5. Demonstrate C-17 load planning computations.

C-17 CHARACTERISTICS

5.1. The C-17 Globemaster III. The C-17 Globemaster III (figure 5.1.) is built by the Boeing Corporation. Its primary mission is the intra-theater (tactical) airlift of outsized items of cargo to small austere airfields at or near the battle area, by aerial delivery or air-land methods. The C-17 has the capability to be reconfigured in-flight from rolling stock configuration to: logistic palletized configuration, equipment/paratroop air-drop configuration, passenger/troop carrying configuration, or litter/ambulatory aero-medical configuration. Should mission dictate, onboard aircraft equipment will accommodate any combination of the above configurations. This chapter explains the basic planning factors necessary to prepare for airlift aboard the C-17 aircraft.

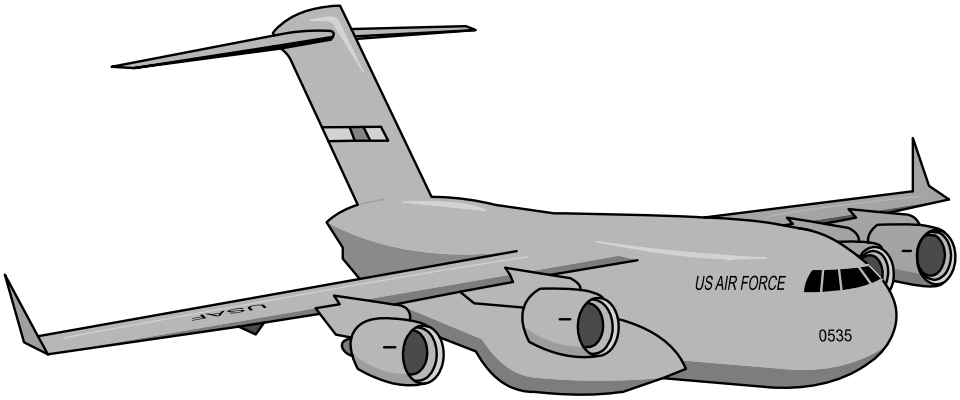


Figure 5.1. C-17 Aircraft

5.2. Dimensional Planning Factors (figure 5.12.). The size of the C-17 cargo compartment allows it to carry cargo that will not fit on other airlift aircraft. The cargo compartment is 818 inches long, 213 inches wide and cargo may be loaded up to 142 inches high. The usable dimensions of the cargo ramp is 238 inches long, 213 inches wide and 128 inches high (when closed). **These dimensions allow the loading of outsized items of cargo measuring 142 inches high or 208 inches wide.** If your cargo exceeds these dimensions, you must coordinate with your affiliated AMCU.

5.3. Weight Considerations. The C-17 has specific weight limitations to which you must adhere. The ACL of the C-17 is variable, but for most operations you may plan for loads up to 130,000 pounds.

5.3.1. Compartment Limitations. Ensure the following compartment weight limitations are not exceeded. See Figure 5.2 below and Figure 5.11.

Compartment	Stations	Maximum weight
D	347-578	72,000 lbs.
E	578-1074	170,900 lbs.
F	1074-1165	35,000 lbs.
G	1165-1403	40,000 lbs.

Figure 5.2. C-17 Compartment Limitations

C-17 CHARACTERISTICS

5.3.2. Compartment Axle Limitation. Fuselage stations 347 through 578 and 1074 through 1403 (compartments D, F, and G) are restricted to maximum single axle weights of 27,000 pounds. Fuselage stations 578 through 1074 (compartment E) are restricted to maximum single axle weights of 36,000 pounds. Refer to figure 5.3. and 5.5. for axle zone restrictions.

5.4. Vehicles/Non-powered AGE Considerations.

5.4.1. **SIDE-BY-SIDE LOADING RESTRICTIONS.** When loading vehicles side-by-side, the effects of each axle or group of axles must be checked to ensure loading restrictions are not exceeded. Side-by-side restrictions apply to an 8-foot zone that extends 4 feet forward and 4 feet aft of the center of the heaviest single axle in the zone. All axles will be checked to ensure they are within the allowable limits. If two or more single axles on one side fall within the same 8-foot zone, the axles will be treated as one axle and the total weight shall not exceed axle chart limits.

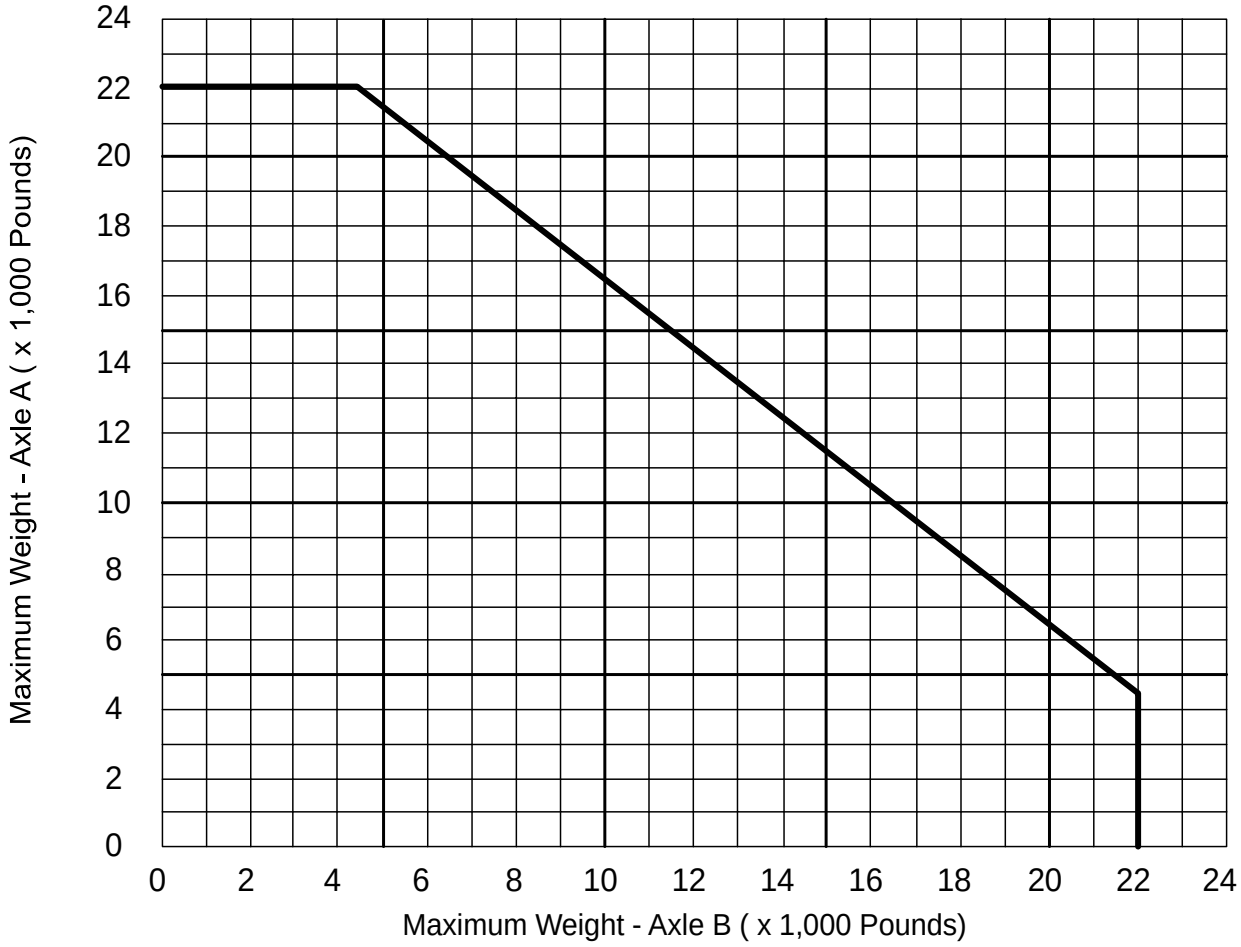
NOTE: *Axles exceeding 22,000 up to 27,000 pounds in compartments D (347-578). F, (1074-1165) or G (1165-1403) must be centerline loaded (+ or -) 8 inches of aircraft centerline. Axles 22,000 or less can be side by side loaded by using the 27,000 pound chart.*

EXAMPLE: If two or more axles are in an 8 foot zone, take the heaviest axle, enter the 27,000 pound chart to determine the maximum allowable axle(s) weight that can be placed in this 8 foot zone.

NOTE: *Axles exceeding 27,000 up to 36,000 pounds in compartments E (578-1074). must be centerline loaded (+ or -) 8 inches of aircraft centerline. Axles 27,000 or less can be side by side loaded by using the 36,000 pound chart.*

C-17 CHARACTERISTICS

C-17 Chart #1
27,000 Pound Axle Zone
FS 347 - 578, and FS 1074 - 1403
(Compartments D, F, and G)



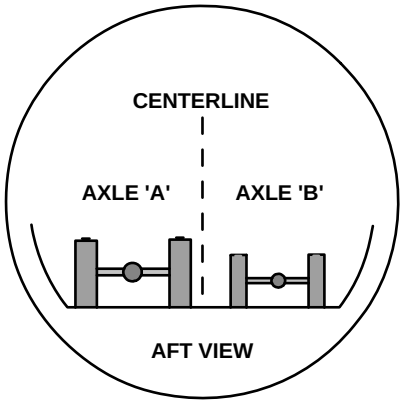
NOTE: *These side-by-side axle combinations apply only to compartment D, F and G (fuselage stations 347 - 578 and 1074 - 1403)*

Figure 5.3. C-17 27,000 lb. Axle Zone Chart

C-17 CHARACTERISTICS

CALCULATION PROCEDURES: Enter on the left side of graph at weight of heaviest axle (axle A). Move laterally to the diagonal line. Move down to determine allowable weight for opposing axle (axle B).

Stations 347 to 578 and 1074 to 1403



EXAMPLE. Given: Axle “A” weighs 16,000 pounds.
Determine: Axle “B” allowable weight.

SOLUTION. By following the above procedure, we determine that the permissible weight for axle “B” is 10,500 pounds.

Figure 5.4. C-17 Side-by-Side Loading Restrictions (Compartments D, F, and G)

C-17 CHARACTERISTICS

C-17 Chart #2
36,000 Pound Axle Zone
FS 578 - 1074
(Compartment E)

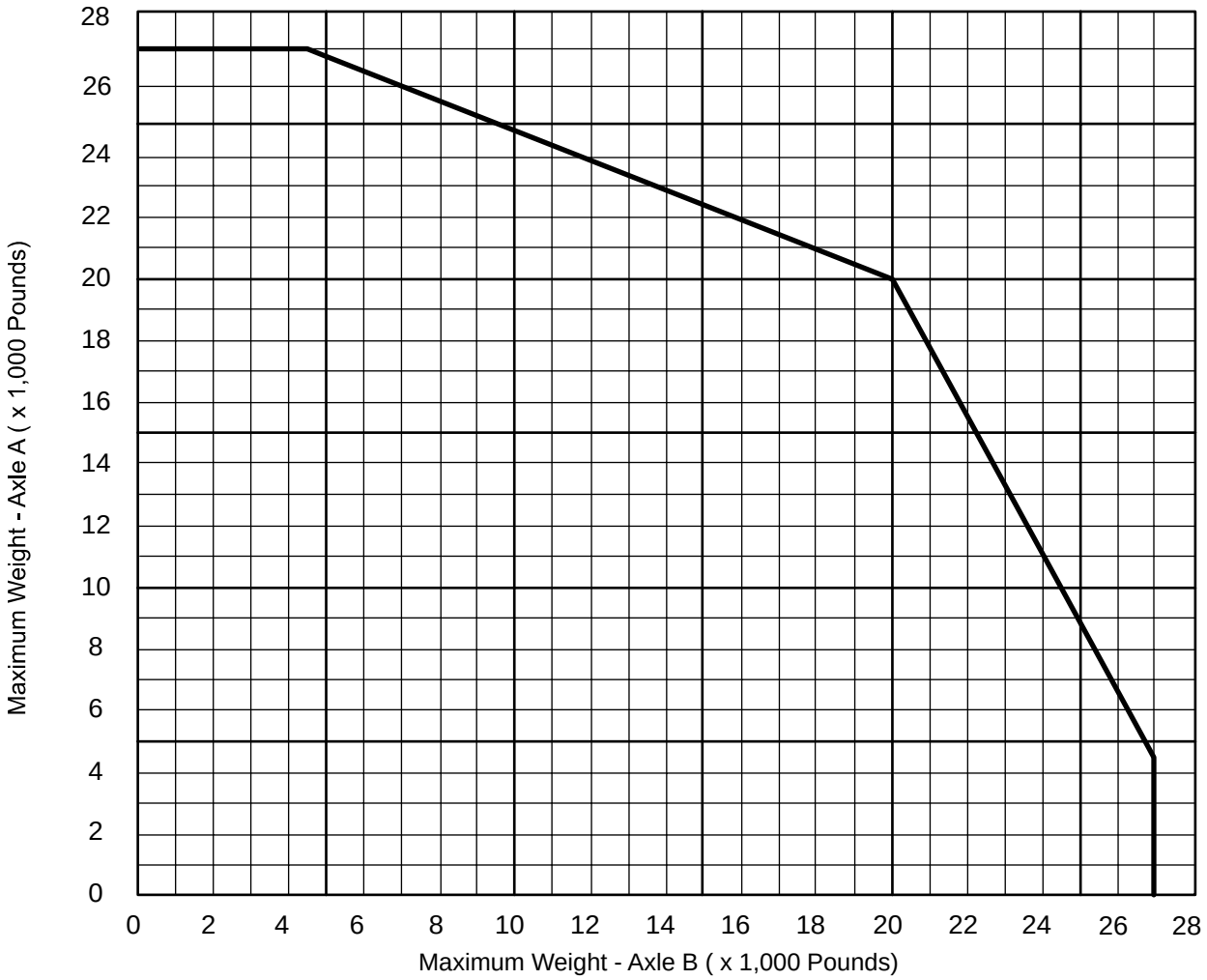
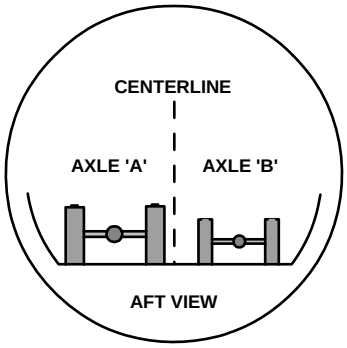


Figure 5.5.

NOTE: *These side by side axle combinations apply only to compartment E (578 to 1074). CALCULATION PROCEDURES: Enter on the left side of graph at weight of heaviest axle (axle A). Move laterally to the diagonal line. Move down to determine allowable weight for opposing axle (axle B).*

C-17 CHARACTERISTICS

Stations 578 to 1074



EXAMPLE. Given: Axle “A” weighs 24,000 pounds.
Determine: Axle “B” allowable weight.

SOLUTION. By following the above procedure, we determine that the permissible weight for axle “B” is 11,500 pounds.

Figure 5.6. C-17 Side-by-Side Loading Restrictions (Compartment E)

All vehicles, tracked or on pneumatic tires, whose gross weight exceeds 65,000 pounds, will be loaded within 8 inches of aircraft centerline. See figures 5.4. through 5.7. for side by side loading examples.

5.4.2. **TRACKED VEHICLES LOADED BESIDE SINGLE AXLES.** Use the following table for tracked vehicles loaded beside single axles.

Stations 347 to 578 and 1074 to 1403:

Tracked vehicle weight	Maximum single axle weight
35,000 lbs. or less	16,000 lbs.
35,001 lbs. to 65,000 lbs.	11,000 lbs.

Stations 578 to 1074:

Tracked vehicle weight	Maximum single axle weight
35,000 lbs. or less	24,000 lbs.
35,001 lbs. to 65,000 lbs.	22,000 lbs.

Figure 5.7. C-17 Tracked Vehicle Weight Restrictions

C-17 CHARACTERISTICS

5.5. Pallet Considerations. The C-17 has the capability of carrying pallets in either the logistics restraint rail system (Logistic), aerial delivery rail system (ADS), or a combination of the two. All pallet positions can accommodate 10,355 pounds each with a maximum height of 96 inches for netted cargo.

NOTE: *Use caution in pallet position 1 if height is above 78" to prevent striking the oxygen distribution line.*

NOTE: *The maximum weight allowed on the cargo ramp is restricted to 40,000 pounds.*

A. Logistic: The logistics system can carry 18 pallet positions loaded on 88" width bias. 14 pallets may be loaded on the main floor and 4 pallets on the ramp for a total of 18 pallets.

B. ADS: The ADS system can carry 11 pallet positions loaded on 108" width bias. 9 pallets may be loaded on the main floor and 2 pallets on the ramp for a total of 11 pallets.

C. Combination: The pallet restraint system on the aircraft floor allows for a mixture of both the logistics and aerial delivery systems. The combination of the systems allows for greater flexibility in the compromise between palletized cargo and troop/ passenger seating.

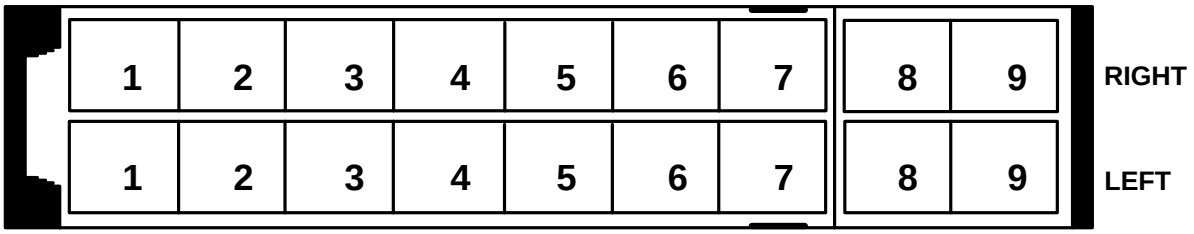


Figure 5.8. C-17 Logistics Rail System (Logistic or LOG)

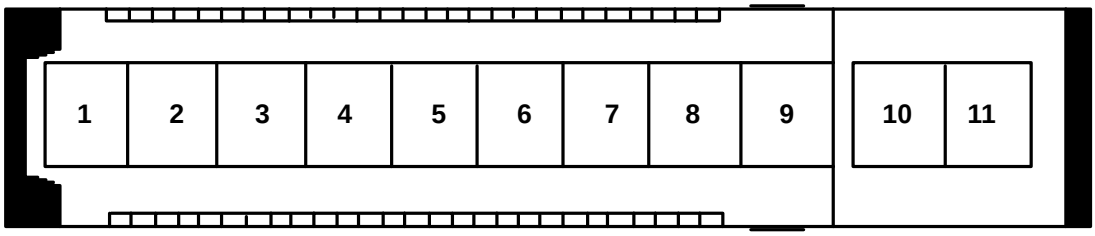


Figure 5.9. C-17 Aerial Delivery Rail System (ADS)

C-17 CHARACTERISTICS

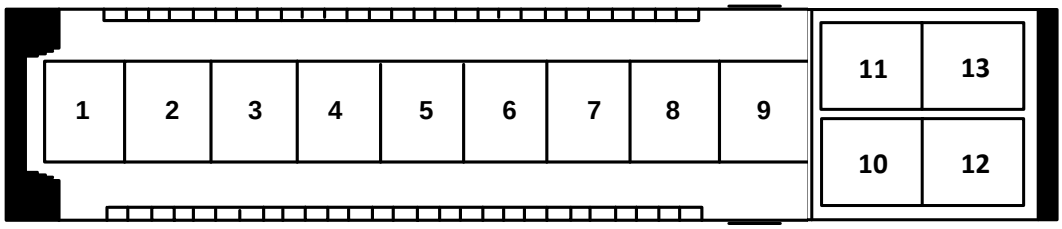


Figure 5.10. C-17 Combination of ADS and LOG

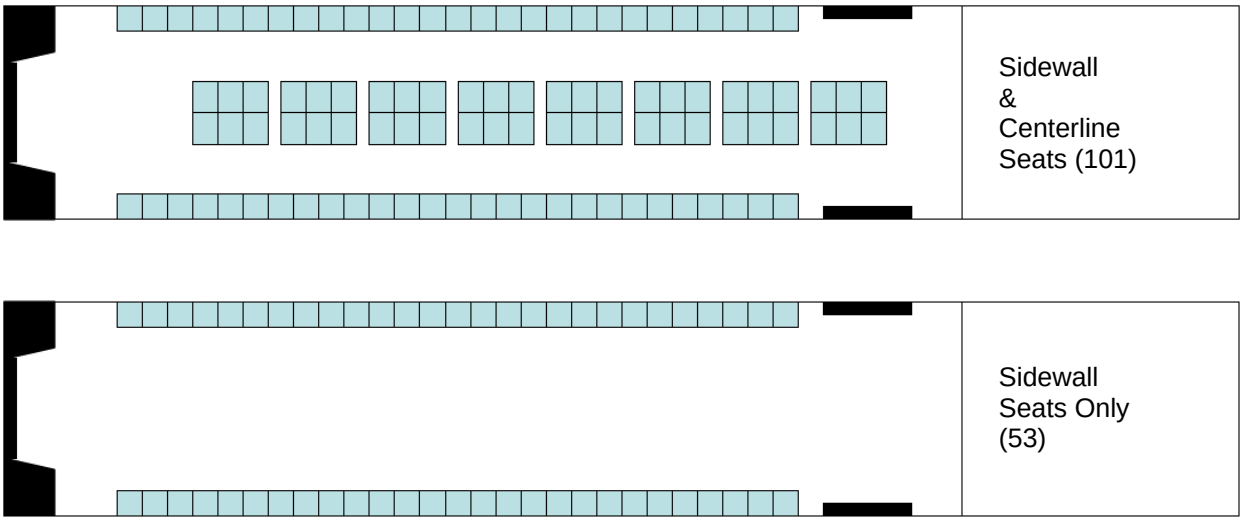


Figure 5.11. C-17 Typical Passenger Seat Configurations

5.6. Passenger Considerations. The C-17 can carry a maximum of 101 troops using centerline and sidewall seats. When using permanently installed sidewall seating a maximum of 53 troops or passengers can be carried. See figure 5.11. for passenger seat configurations.

5.6.1. Additional Loadmaster (LM) / Crewmember Requirement. When carrying more than 40 passengers in any configuration, maximum seating capacity must be reduced by one to accommodate the requirement for an additional C-17 qualified crewmember in the cargo compartment for takeoff and landing. Example: 54 sidewall seats minus 1 for additional LM = 53 available passenger seats.

5.6.2. Palletized Seat Kit. Palletized seat kits are typically used for intra-theater passenger movement only and are not readily available for inter-theater contingency movement. When installed, a maximum of 143 seats are available for flights over land. Flights over water are limited to 138 personnel (including crew) based on life raft

availability. Over water flights with more than 138 personnel (including crew) requires MAJCOM/A3 waiver.

5.9.3. Passengers Beside Netted or Strapped Cargo. When the load consists of palletized netted cargo or cargo that is secured with straps, a 30-inch space will be maintained between the cargo and the nearest forward occupied seat. Passengers will not be seated alongside pallets loaded in the Logistics rail system, regardless of pallet construction.

5.9.4. Passengers Beside Bulk/Wheeled Cargo. If bulk cargo and/or vehicles are loaded on the main cargo floor, sidewall seats adjacent to cargo extending past +/- 85 inches of aircraft center will not be used.

5.9.5. Passenger Baggage. When 20 or more passengers/troops are planned, a pallet position shall be left open to accommodate palletized/floor loaded baggage.

5.9.5.1. Rucksacks. The following procedures apply to loading of rucksacks:

- In all cases, rucksacks will be loaded on the same aircraft as the individual.

- Transported units must ensure that adequate space is provided on the load plan and aircraft to ensure all personnel have an unobstructed path to evacuate the aircraft during an emergency.

5.10. Configurations. Standard cargo compartment configurations are designed to ensure aircraft arrive at the airfield prepared to immediately load the equipment and personnel. The load planner must select the proper configuration code to avoid loading delays. Figure 5.12. depicts three of the most common deployment configurations. Refer to AFI 11-2C-17 Vol 3 Addenda A for detailed configuration information and modifications.
NOTE: Load planners will typically utilize the Standard Air Land (STD AL) configuration when creating load plans with ICODES software.

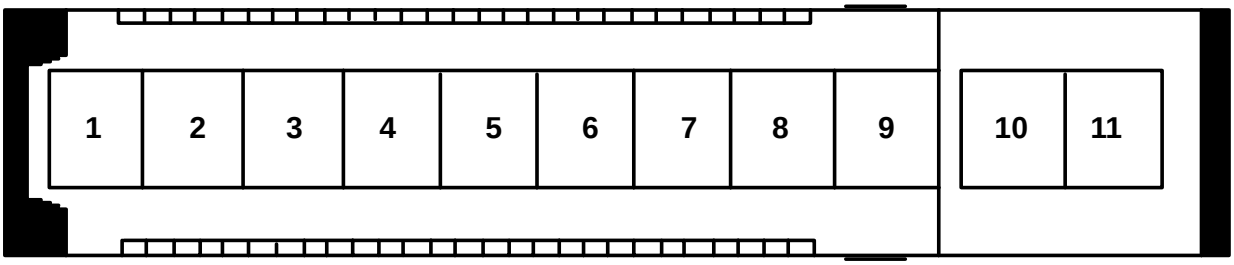
5.11. Load Planning Factors. Air Mobility Command (AMC) instituted a fuel efficiency initiative to optimize fuel usage. Mission planners will manage aviation fuel as a limited commodity and precious resource. Fuel optimization will be considered throughout all phases of mission planning.

5.11.1. Optimum ZFW CG. C-17 aircraft will be load planned as follows unless specific loading instructions dictate otherwise. Aircraft + cargo weights:

Less than 400,000 lbs. = 40% MAC
400,001 - 425,000 lbs. = 39% MAC
425,001 - 447,000 lbs. = 38% MAC

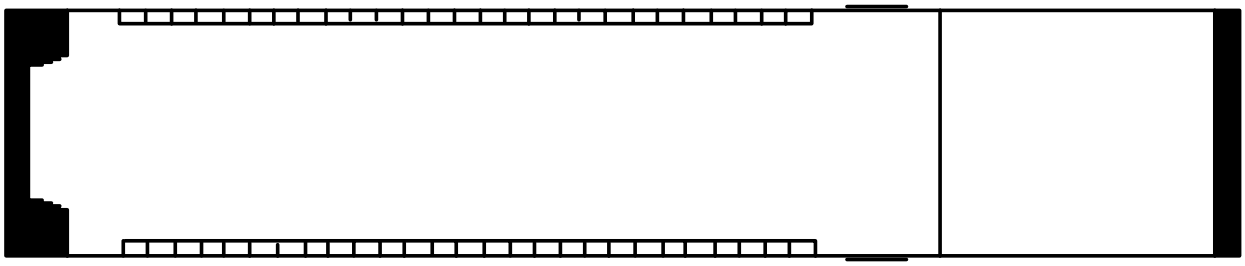
C-17 CHARACTERISTICS

CONFIGURATION C-1



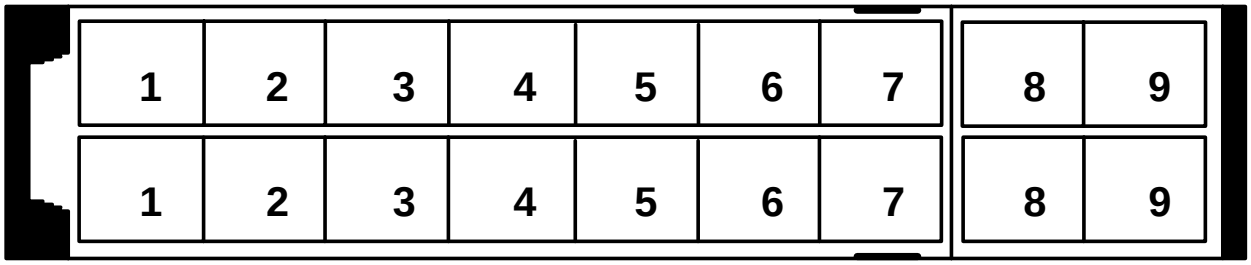
1. 54 SEATS OFFERED
2. 11 463L PALLETS

CONFIGURATION C-2



1. 54 PASSENGER SEATS OFFERED IF FLOOR LOAD AND/OR VEHICLES DO NOT EXCEED MAXIMUM WIDTH OF 170".

CONFIGURATION C-3



1. 18 463L PALLETS. PALLETS MUST BE ROTATED 90 DEGREES WHILE LOADING/UNLOADING

Figure 5.12. C-17 Configurations

C-17 CHARACTERISTICS

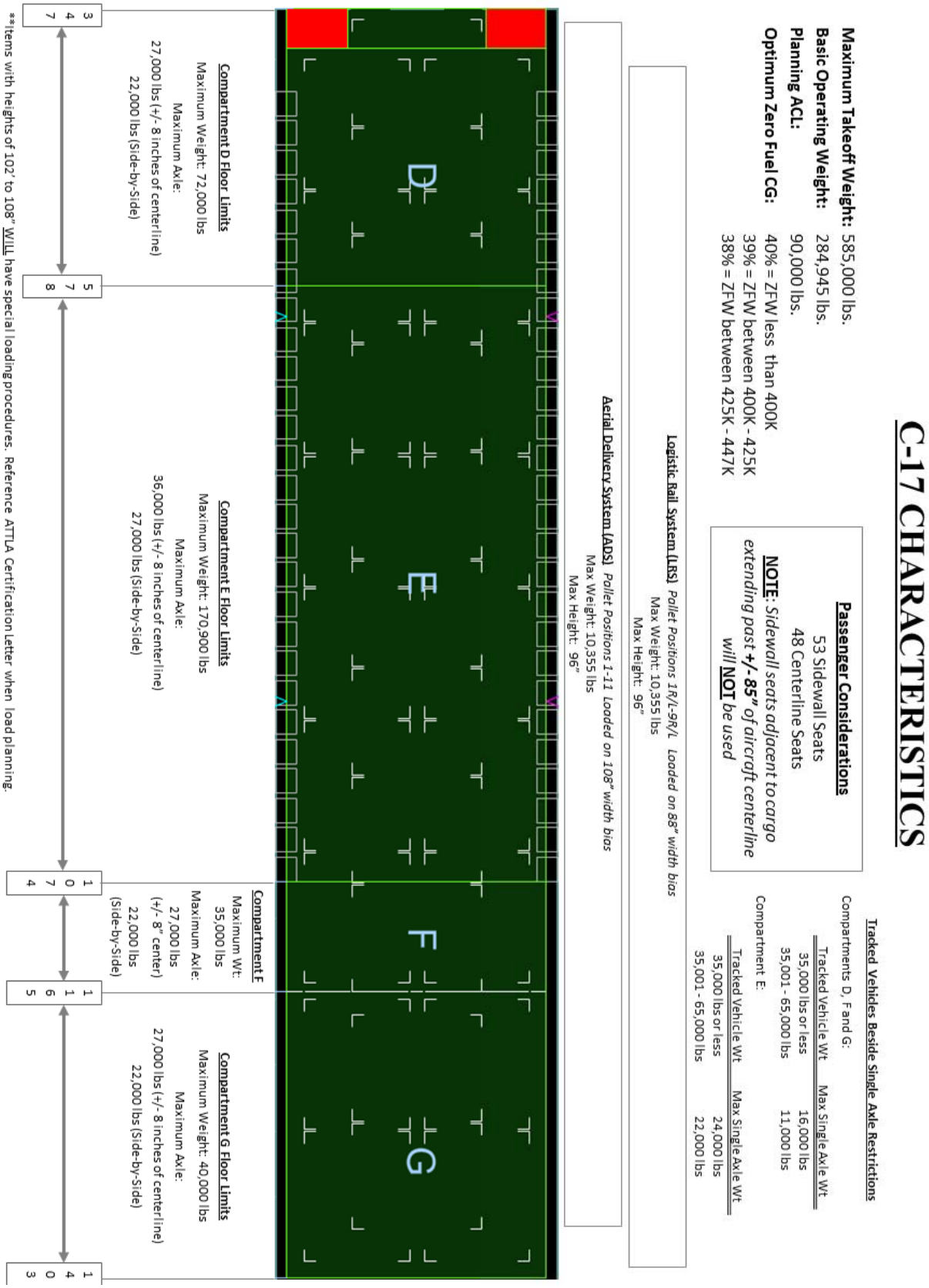


Figure 5.11. C-17 Floor Schematic

C-17 CHARACTERISTICS

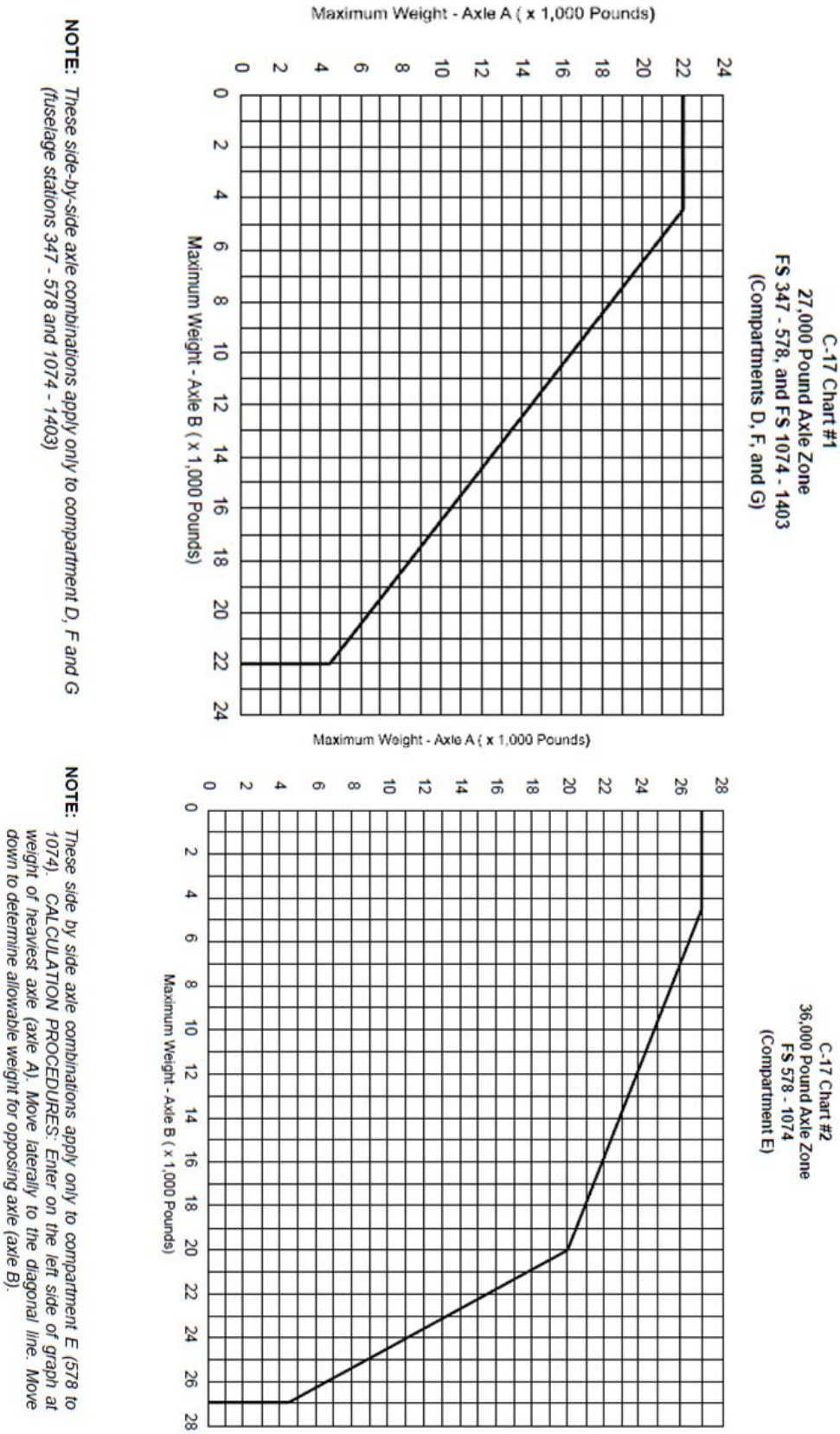


Figure 5.12. C-17 Fact Sheet

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KC-10 CHARACTERISTICS

chapter

6

AMC

Lesson Objectives: The objective of this lesson is for each student to comprehend the characteristics of a KC-10 for load planning purposes.

References: AFI 24-103 AMC Cargo Load Planning Template System
DOD 4500.9-R Part III, Defense Transportation Regulation (DTR)
T.O. 1C-10(K)A-9 Cargo Loading Manual
AFI 11-2KC-10V3 Addenda A
AMCI 24-101 Volume 11

Web Pages: http://www.transcom.mil/dtr/part-iii/

Learning Activities:

1. KC-10 Extender
2. Types of Cargo
3. Compartment Considerations
4. Passenger Considerations
5. Load Planning Factors
6. Configurations

Test Objectives:

1. Summarize the mission and the capabilities of the KC-10 aircraft.
2. Give examples of weight, pallet, and passenger considerations when preparing to load plan a KC-10 aircraft.
3. Explain how to use axle chart when determining distance required between axles.
4. Describe the different configurations for the KC-10 aircraft.
5. Demonstrate KC-10 load planning computations

KC-10 CHARACTERISTICS

6.1. The KC-10 Extender. The KC-10 Extender is designed for a dual-purpose mission: air refueling and inter-theater (strategic) airlift. The KC-10 is comparable to the commercial DC-10. Cargo is carried on the upper deck and fuel tanks are beneath the floor. The KC-10 has almost four times the cargo capability of a C-130. This chapter explains the basic cargo capabilities, limitations, and unique loading requirements necessary for load planning the KC-10.

Figure 6.1. KC-10 Aircraft.

6.2 ACL. The planning ACL is 65,200 pounds. Contact your affiliated AMCU to request a waiver. Cabin load includes passenger and cargo weight. Cabin loads will never be more than 100,000 pounds for Code B and 139,000 pounds for Code D.

6.3. Material Handling Equipment. The KC-10 requires a loader capable of reaching 17 feet. The typical loaders used for loading/off-loading the KC-10 include the 25K Halverson (NGSL) loader and the 60K (Tunner) loader.

KC-10 CHARACTERISTICS

6.4. Dimensional Planning Factors. The cargo compartment of the KC-10 is 1198 inches long, 197 inches wide, and supports cargo up to 96 inches high. Unlike other cargo aircraft, the KC-10 cargo floor cannot withstand the stress of floor loading. 463L pallets must be used for **ALL** cargo loaded on the KC-10. When cargo isn't palletized with nets, 463L pallets must be used as a sub-floor. When installed, these pallets provide a loading surface and tiedown fittings to secure equipment.

6.4.1. Cargo Door. The cargo door of the KC-10 is located on the forward left side of the cargo compartment. It is 140 inches wide and 102 inches high. When cargo is larger than a two-pallet train, you must consider it's ability to fit into the cargo door, spin into alignment with the rails and not contact the door jam or the aircraft fuselage (see figure 6.2.). For example, a vehicle 84 inches wide and 72 inches high can be no longer than 280 inches. A change in any dimension may result in a change of the maximum allowable in the other dimensions.

		Package Dimension Chart										
		PACKAGE WIDTH										
HEIGHT		**12"**	**24"**	**36"**	**48"**	**60"**	**72"**	**84"**	**96"**	**108"**	**120"**	**132"**
	0-36"	1,323	982	660	520	440	380	330	295	265	240	205
	48"	1,266	900	620	500	430	370	330	290	260	230	200
	60"	1,016	680	550	470	390	350	310	275	250	220	195
	72"	740	600	490	410	360	320	280	255	230	205	180
	84"	590	490	420	370	325	285	255	230	210	185	160
	96"	490	420	370	325	285	260	235	210	185	170	145

Figure 6.2. Package Dimension Chart-Cargo Loaded Aft of Cargo Door

NOTES:

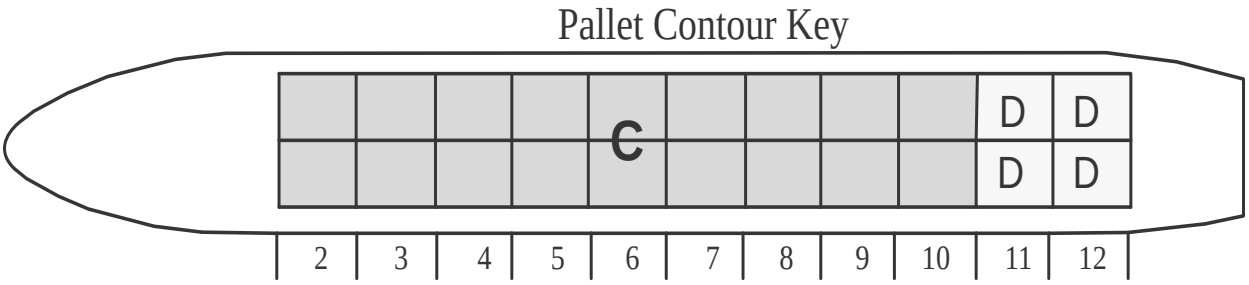
A. Measure heights from the upper surface of the pallet.
B. For dimensions not shown in this chart, refer to the next higher dimension.
C. Packages exceeding the lengths, widths, and/or heights allowed by this chart will not be planned for airlift without the approval of the AMCU.

6.4.2. Pallet Alignment & Rail System. After entering the cargo door, palletized cargo is rotated into position utilizing omni-directional rollers located on the floor. Like the C-17 logistics rail system, pallets are loaded on the 88 inch width bias (88 inches wide by 108 inches long).

6.4.2.1. Due to the necessity of rotating cargo as it enters the cargo door, two-pallet trains are not able to be loaded in positions adjacent to the cargo door (pallet positions **2-3L**)

KC-10 CHARACTERISTICS

6.5. Cargo Compartment Profile. Since the KC-10 cargo compartment isn't square, we must use figures (6.3.-6.5.) to determine where pallets are physically able to be loaded within the cargo compartment.



Note: *When utilizing Contour "C" or "D" charts, items that contact **on or below the line** are acceptable for airlift for that compartment.*

Figure 6.2. Pallet Contour Key

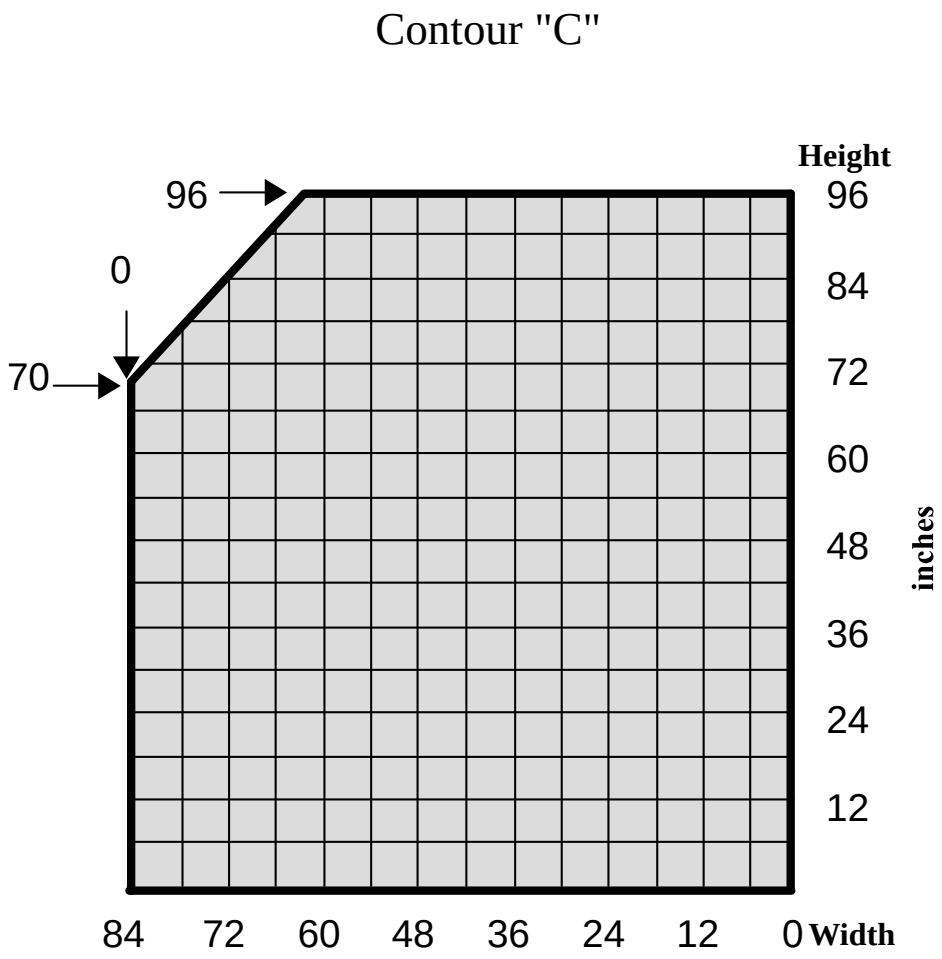


Figure 6.3. KC-10 Pallet Profile (Contour "C")

KC-10 CHARACTERISTICS

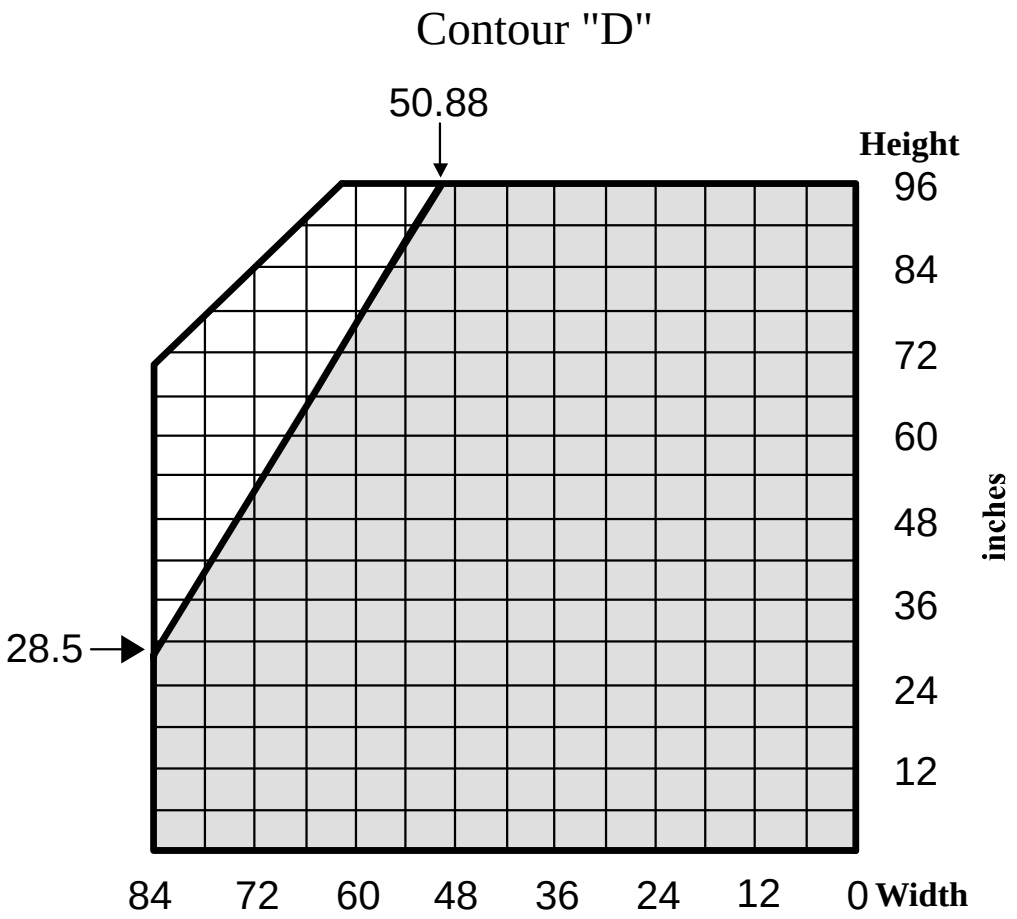


Figure 6.4. KC-10 Pallet Profile (Contour "D")

6.6. Types of General Cargo. Palletized cargo can be categorized into three types; 'uniform' loads (flat-bottomed boxes), 'concentrated' loads (skid/contact mounted), or wheeled cargo.

A. **Uniform** loads: cartons or boxes with even weight distribution over the entire bottom.
B. **Concentrated** loads: cargo that is usually too heavy or large to be handled easily and is mounted on skids or supports.
C. **Wheeled** cargo loads: the KC-10 has restrictions in each compartment for wheeled cargo loads.

6.6.1. Maximum Gross Weight by Cargo Type. Each type of cargo places unique stress on the aircraft, and has a specific weight limitation. These limitations are based on the **gross weight** of the pallet. This includes the weight of the pallet, nets, straps, chains and devices. Figure 6.5 and 6.X display the maximum allowable weight per pallet position for each cargo type. Pallets containing multiple cargo types (i.e. uniform and concentrated) must use the most restrictive (lowest) gross weight.

KC-10 CHARACTERISTICS

PALLET POSITION MAXIMUM LOAD (LBS)

2R 6500	3R 6500	4R 6500	5R 6500	6R 6500	7R 10,000	8R 10,000	9R 10,000	10R 10,000	11R 10,000	12R 6500
2L 6500	3L 6500	4L 6500	5L 6500	6L 6500	7L 10,000	8L 10,000	9L 10,000	10L 10,000	11L 10,000	12L 6500

Uniform Loads

PALLET POSITION MAXIMUM LOAD (LBS)

2R 6500	3R 6500	4R 6500	5R 6500	6R 6500	7R 10,000	8R 10,000	9R 10,000	10R **7,000**	11R **7,500**	12R 6500
2L 6500	3L 6500	4L 6500	5L 6500	6L 6500	7L 10,000	8L 10,000	9L 10,000	10L **7,000**	11L **7,500**	12L 6500

Concentrated Cargo

PALLET POSITION MAXIMUM LOAD (LBS)

2R 6500	3R 6500	4R 6500	5R 6500	6R 6500	7R 10,000	8R 10,000	9R 10,000	10R **8,000**	11R **8,000**	12R 6500
2L 6500	3L 6500	4L 6500	5L 6500	6L 6500	7L 10,000	8L 10,000	9L 10,000	10L **8,000**	11L **8,000**	12L 6500

Wheeled Cargo

Figure 6.5. KC-10 Compartment Weights

6.6.2. Uniform Loads. A **uniform load** is cargo, such as cartons or boxes, with even weight distribution over the entire bottom of the item of cargo. In addition to the gross weight limitations in Figure 6.6, individual uniform item's net weight (weight of the cargo item only) must not exceed the pounds per linear foot (PLF) limitation. Figure 6.6. shows restrictions placed on uniform loads based on pounds per linear foot (PLF). Figures 6.8. and 6.9. provide sample problems. To compute PLF:

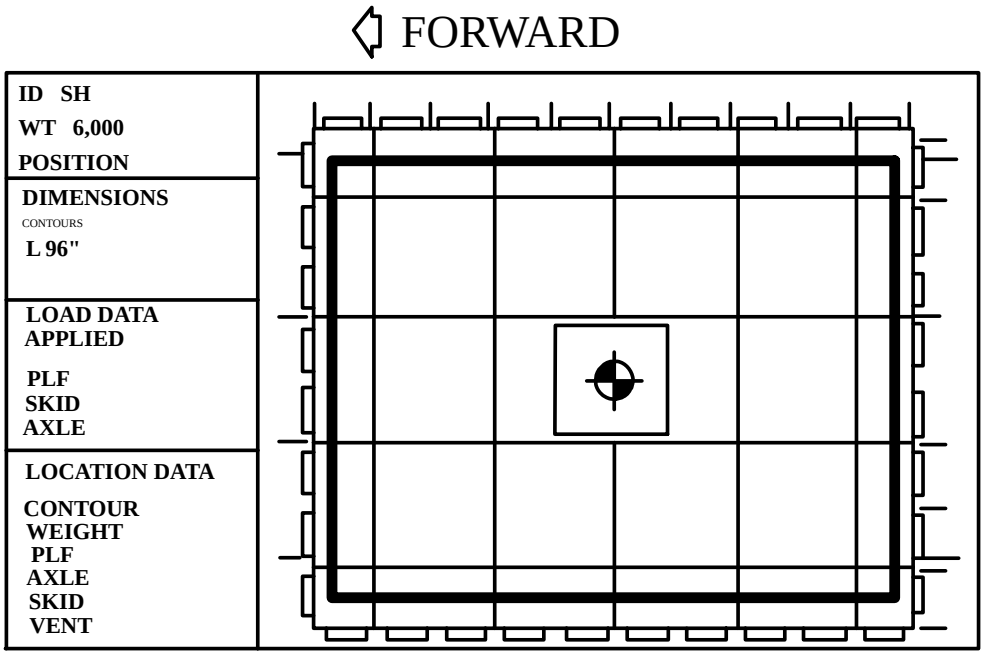
$$\frac{\text{ITEM WEIGHT}}{\text{ITEM LENGTH}} \times 12 = \text{PLF}$$

UNIFORM LOADS LIMITATION CHART	
Pallet Position	**PLF Limit (net weight)**
2	738
3	738
4	738
5	738
6	888
7	1,452
8	1,452
9	1,452
10	1,368
11	1,110
12	738

6.6.2.1. **NOTE:** Use non-standard rounding procedures. Any decimal amount is rounded up to the next higher whole number.

Figure 6.6. KC-10 Uniform Loads Limitations Chart.

KC-10 CHARACTERISTICS



To determine pounds per linear foot (PLF), divide the weight of the item by the length of floor space it covers and multiply that number by twelve.

Note: *The cargo length is the dimension that corresponds to the 108-inch side of the pallet.*

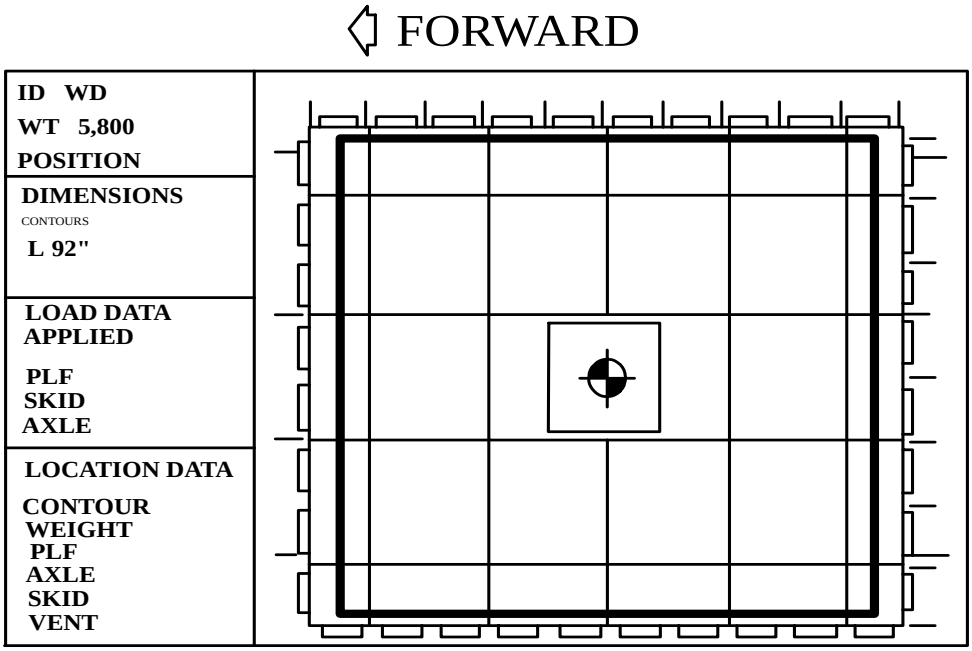
A box of cargo is to be loaded as shown above. Calculate the load limits and determine where the pallet may be loaded.

Applied Load - Length = 96 inches Weight = 6,000 pounds

Allowable positions =

Figure 6.7. Sample Problem, Uniform Loads.

KC-10 CHARACTERISTICS



A box of cargo is to be loaded as shown above. Calculate the load limits and determine where the pallet may be loaded.

Applied load - Length = 92 inches Weight = 5,800 pounds

Allowable positions =

Figure 6.8. Sample Problem, Uniform Loads.

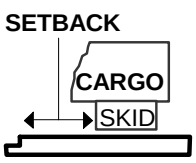
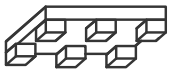
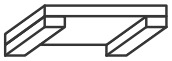
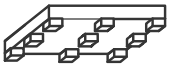
6.6.3. **Concentrated loads** are loads supported by skids or small contact points. The cargo usually is too heavy or large to be handled easily and is mounted on skids or supports. This facilitates cargo handling with forklifts. These supports are sometimes referred to as contact points. See figure 6.10. for restrictions and figures 6.11. through 6.13. for examples and sample problems.

6.6.3.1. Skid: A supporting base; if the length is greater than 20 inches.

6.6.3.2. Contact point: A footprint area; if both the width and length is less than 20 inches.

KC-10 CHARACTERISTICS

Concentrated Load Limitations Chart

Pallet Positions left or right		Any Configuration of contact points or skids	 6-8 contact points  2 skids	 9 contact points or more  3 skids or more
2	none	3,800	3,800	5,700
3	none	3,800	3,800	5,700
4	none	5,200	6,100	6,100
5	none	3,800	5,800	6,100
6	less than 10 inches	2,500	3,600	4,000
	10 inches or more	4,000	5,800	6,100
7	less than 10 inches	1,800	3,700	4,400
	10 inches or more	2,500	5,000	5,900
8	less than 10 inches	1,800	3,700	4,400
	10 inches or more	2,500	5,000	5,900
9	none	2,500	5,000	5,900
10	none	4,700	6,600	6,600
11	none	4,000	6,100	6,100
12	none	4,300	6,100	6,100

- All pallet positions, except 10 L/R and 11 L/R, may be loaded to their maximum compartment weights with any combination of concentrated loads from columns 1, 2, or 3. The maximum weight for pallet position 10 is 7,000 pounds, and for pallet position 11 is 7,500 pounds when loaded with any concentrated loads (skids or contact points).

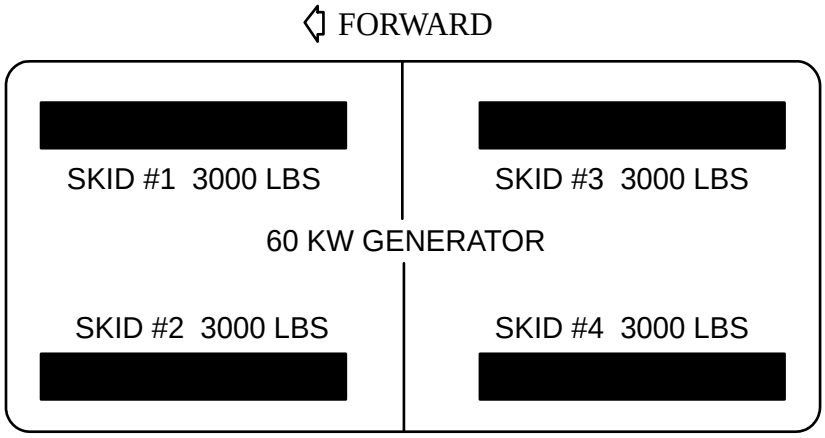
- A combination of concentrated and uniform loads can be used in pallet positions 10 and 11 provided the maximum concentrated compartment load is not exceeded. Example: Pallet Position 11R contains an item weighing 4,800 pounds mounted on three skids. Therefore, an additional 2,700 pounds of uniform loaded cargo can be placed in this pallet position. This would not exceed the 7,500 pound concentrated compartment load limit.

- All concentrated loads are in terms of net weight per item.

Figure 6.9. KC-10 Concentrated Load Limitations Chart

KC-10 CHARACTERISTICS

Using the following load information, determine the loadable position (s).



APPLIED LOADS = 60 kw Generator on two pallet train

Length = 100 inches Weight = 12,000 pounds

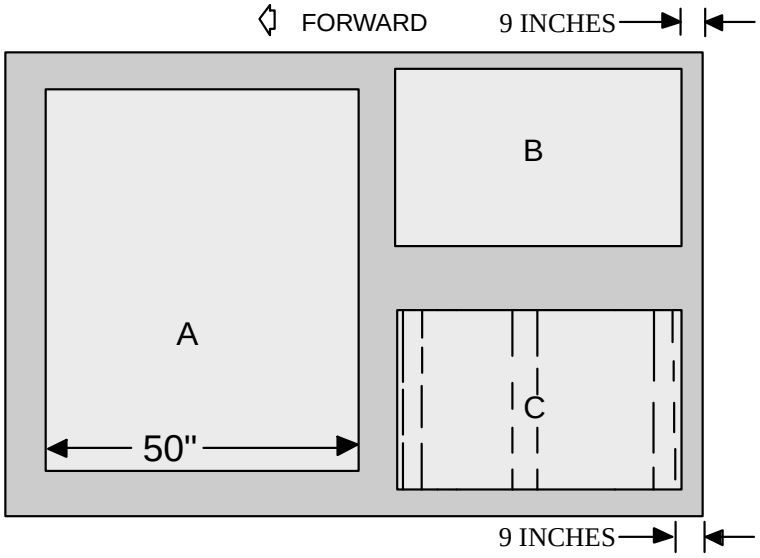
Palletized on 4 skids 44 inches long each
Each skid has 3,000 pounds resting on it.

SOLUTION (Allowable Positions) =
The generator may be loaded longitudinally in any two of pallet positions 10, 11, and 12, left and/ or right. The generator may be loaded laterally in pallet positions 4, 10, 11 or 12 L/R.

Figure 6.10. Example Problem (Concentrated Cargo Load Limits)

KC-10 CHARACTERISTICS

Three boxes of cargo are to be loaded as shown below. Calculate the load limits and determine the pallet location(s) this pallet can be loaded.



APPLIED LOADS = Box A: Length = 50 inches
Weight = 4,450 pounds (uniform load)

Box B: Weight = 2,000 pounds on skids:
number and type of contacts unknown

Box C: Weight = 2,500 pounds on 3 skids:
each 30 inches long

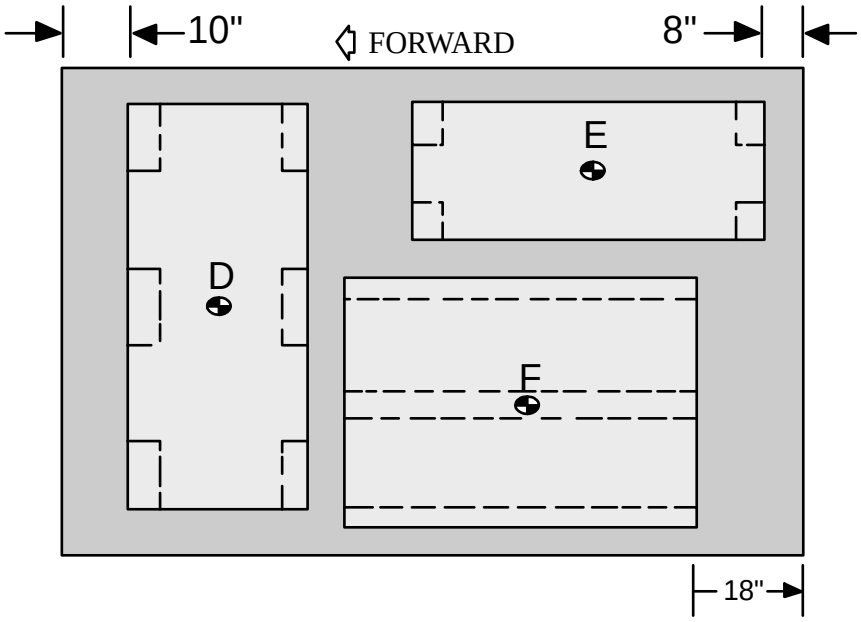
Pallet Weight = 355 pounds (including nets)
Gross Weight = 9,305 pounds

ALLOWABLE POSITIONS =

Figure 6.11. Sample Problem (Concentrated Load Limits)

KC-10 CHARACTERISTICS

Three boxes of cargo are to be loaded as shown below. Calculate the load limits and determine the pallet location(s) this pallet can be loaded.



APPLIED LOADS = Box D:	Length	=	26 inches
	Weight	=	3,200 pounds
	Contact Points	=	12 inches long
Box E:	Length	=	52 inches
	Weight	=	1,250 pounds
	Contact Points	=	8 inches long
Box F:	Length	=	48 inches
	Weight	=	2,600 pounds
	Skids	=	48 inches long
	Pallet Weight	=	355 pounds
	Gross Weight	=	7,405 pounds

ALLOWABLE POSITION (S) =

Figure 6.12. Sample Problem (Concentrated Load Limits)

KC-10 CHARACTERISTICS

6.6.4. Wheeled Cargo Considerations. The allowable axle weight limitation depends on the axle location inside the aircraft. See figure 6.13. for the maximum wheel and axle weight limitations on the KC-10.

6.6.4.1. The KC-10 has limitations on the straight-line distance between axles. This distance is measured forward to aft, side-to-side and diagonal. These limitations must be adhered to whether the wheels are connected by an axle or not. You achieve the maximum allowable weight limit when there is 48 inches or more between axles. If the distance between two axles is less than 48 inches, the allowable wheel weight is reduced. Figure 6.14. lists these limitations

KC-10 CHARACTERISTICS

AXLE REDUCTION CHART				
PALLET POSITIONS				
Distance Between Wheels	**Pallet Positions 2,3,4,5**	**Pallet Position 6**	**Pallet Positions 7,8,9**	**Pallet Positions 10,11,12**
8" or less	2,250	2,400	1,600	2,000
9"	2,306	2,460	1,640	2,050
10"	2,362	2,520	1,680	2,100
11"	2,419	2,580	1,720	2,150
12"	2,475	2,640	1,760	2,200
13"	2,531	2,700	1,800	2,250
14"	2,587	2,760	1,840	2,300
15"	2,644	2,820	1,880	2,350
16"	2,700	2,880	1,920	2,400
17"	2,756	2,940	1,960	2,450
18"	2,812	3,000	2,000	2,500
19"	2,869	3,060	2,040	2,550
20"	2,925	3,120	2,080	2,600
21"	2,981	3,180	2,120	2,650
22"	3,037	3,240	2,160	2,700
23"	3,094	3,300	2,200	2,750
24"	3,150	3,360	2,240	2,800
25"	3,206	3,420	2,280	2,850
26"	3,262	3,480	2,320	2,900
27"	3,319	3,540	2,360	2,950
28"	3,375	3,600	2,400	3,000
29"	3,431	3,660	2,440	3,050
30"	3,487	3,720	2,480	3,100
31"	3,544	3,780	2,520	3,150
32"	3,600	3,840	2,560	3,200
33"	3,656	3,900	2,600	3,250
34"	3,712	3,960	2,640	3,300
35"	3,769	4,020	2,680	3,350
36"	3,825	4,080	2,720	3,400
37"	3,881	4,140	2,760	3,450
38"	3,938	4,200	2,800	3,500
39"	3,994	4,260	2,840	3,550
40"	4,050	4,320	2,880	3,600
41"	4,106	4,380	2,920	3,650
42"	4,162	4,440	2,960	3,700
43"	4,219	4,500	3,000	3,750
44"	4,275	4,560	3,040	3,800
45"	4,331	4,620	3,080	3,850
46"	4,387	4,680	3,120	3,900
47"	4,444	4,740	3,160	3,950
48" or more	4,500	4,800	3,200	4,000

NOTES

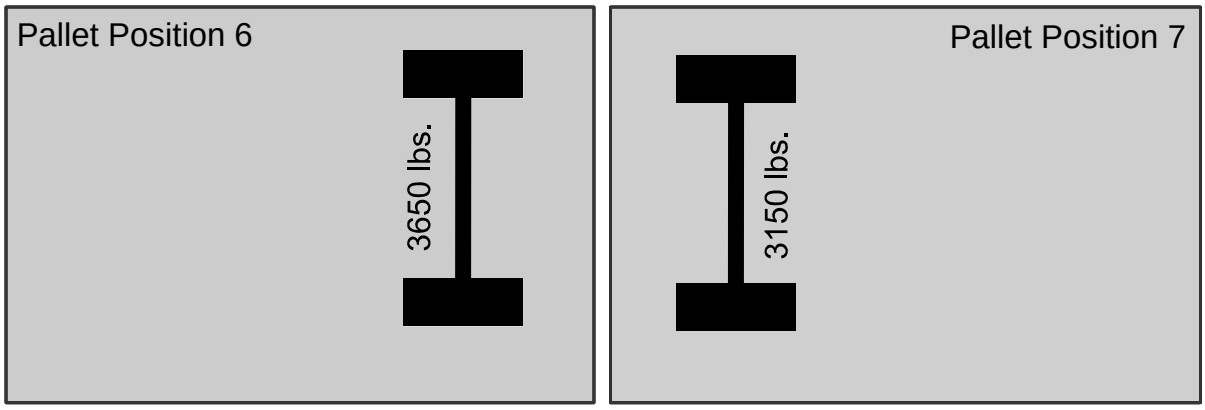
1. Treat dual wheels as one wheel.
2. The compartment weight limits must also be observed.
3. Wheel weights are ½ of axle weights
4. Not used for steel or hard rubber wheels

Figure 6.13. KC-10 Axle Reduction Chart

KC-10 CHARACTERISTICS

Two items are to be loaded as shown below on 463L pallets and planned for pallet positions 6R and 7R.

Calculate the load limits and determine if the cargo can be loaded as shown.



Using Figure 6.14. Axle Reduction Chart to determine the minimum allowable distance between the two adjacent axles.

Pallet Position 6: Contains a 3650 pound axle.

Pallet Position 7: Contains a 3150 pound axle.

1. Enter Axle Reduction Chart at PP6 column, follow down to intersect first weight greater than 3650 lbs., follow chart to left to find minimum allowable distance required = _____ .

2. Enter Axle Reduction Chart at PP7 column, follow down to intersect first weight greater than 3150 lbs., follow chart to left to find minimum allowable distance required = _____ .

Minimum allowable distance for this example = _____ ?

Figure 6.14. Sample Problem (Adjacent Axle Limitations)

KC-10 CHARACTERISTICS

6.7. Shoring Considerations

6.7.1. When loading items such as two-wheeled trailers, shoring is required under the landing gear or tongue to prevent damage to the top surface of the 463L pallet. Other items with steel wheels or similar concentrated loads that exceed the 250 PSI pallet limitation also requires shoring to protect the pallet surface.

6.7.2. Shoring of uniform loads distributes the weight to remain within the pounds per linear foot (PLF) floor limitation.

6.8. Troop Baggage. All hand carried items must fit under the airline style seats or it will be loaded as palletized or secondary cargo (this includes weapons, web gear, rucksacks, and duffel bags).

6.9. Load Planning Factors. Air Mobility Command (AMC) instituted a fuel efficiency initiative to optimize fuel usage. Mission planners will manage aviation fuel as a limited commodity and precious resource. Fuel optimization will be considered throughout all phases of mission planning.

6.9.1. Optimum ZFW CG. The KC-10 will be load planned to 24% Mean Aerodynamic Chord (MAC) unless specific loading instructions dictate otherwise.

6.10. Configurations. As with all cargo aircraft, the KC-10 has several configurations to suit specific mission requirements. The two most common are the Code B and Code D. (see figure 6.15. and 6.16.). Configurations must be requested prior to aircraft departing home station. Other configurations must be coordinated with your affiliated AMCU well in advance.

KC-10 CHARACTERISTICS

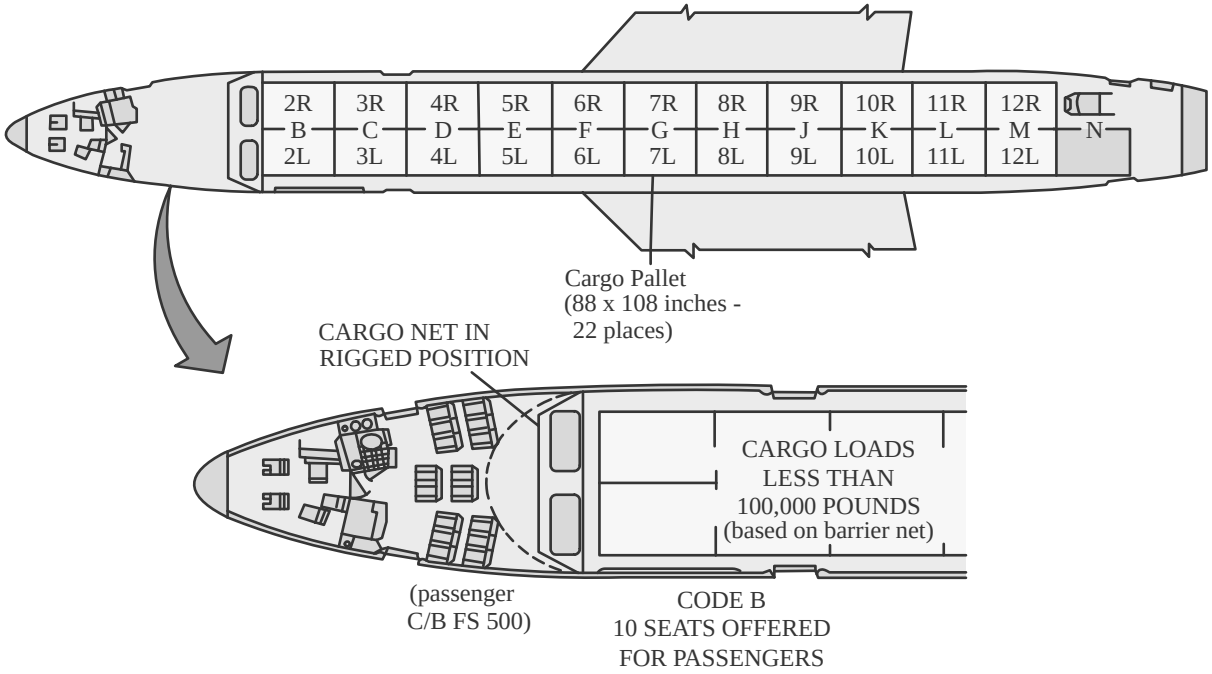


Figure 6.15. KC-10 Code "B" Configuration

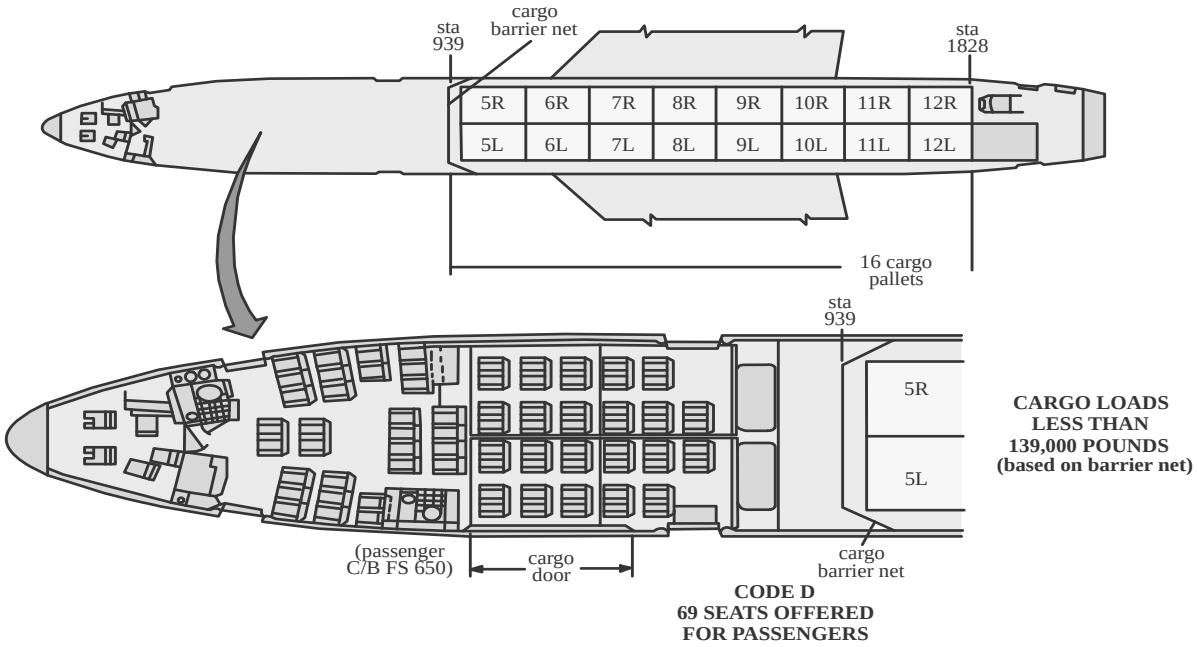


Figure 6.16. KC-10 Code "D" Configuration.

NOTE: *Cargo load maximums listed on figures 6.17. and 6.18. are aircraft structural limits. For planning purposes, users should limit ACL to 65,200 lbs. without coordinating with your affiliated AMCU.*

KC-10 CHARACTERISTICS

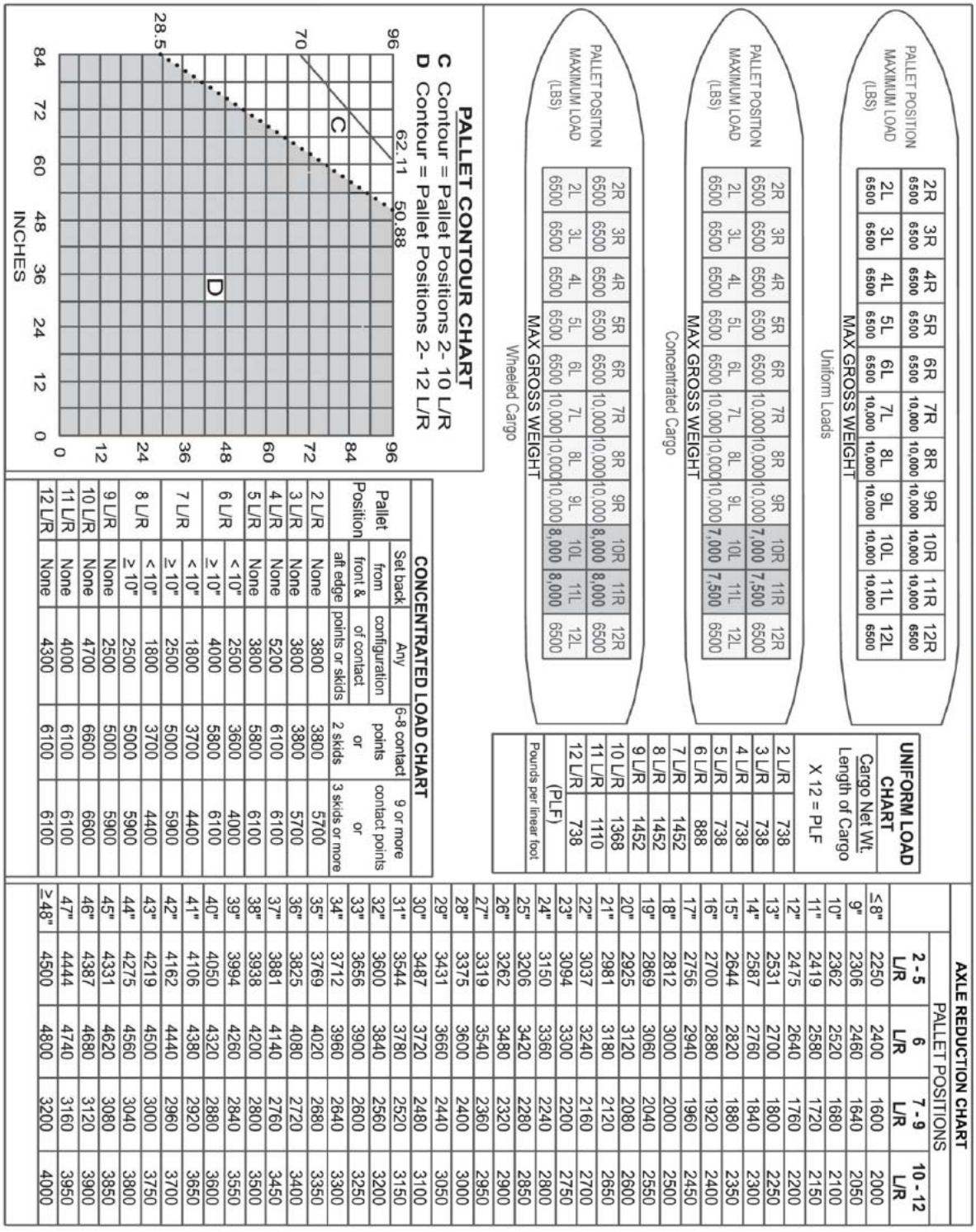


Figure 6.17. KC-10 Reference Sheet

KC-10 CHARACTERISTICS

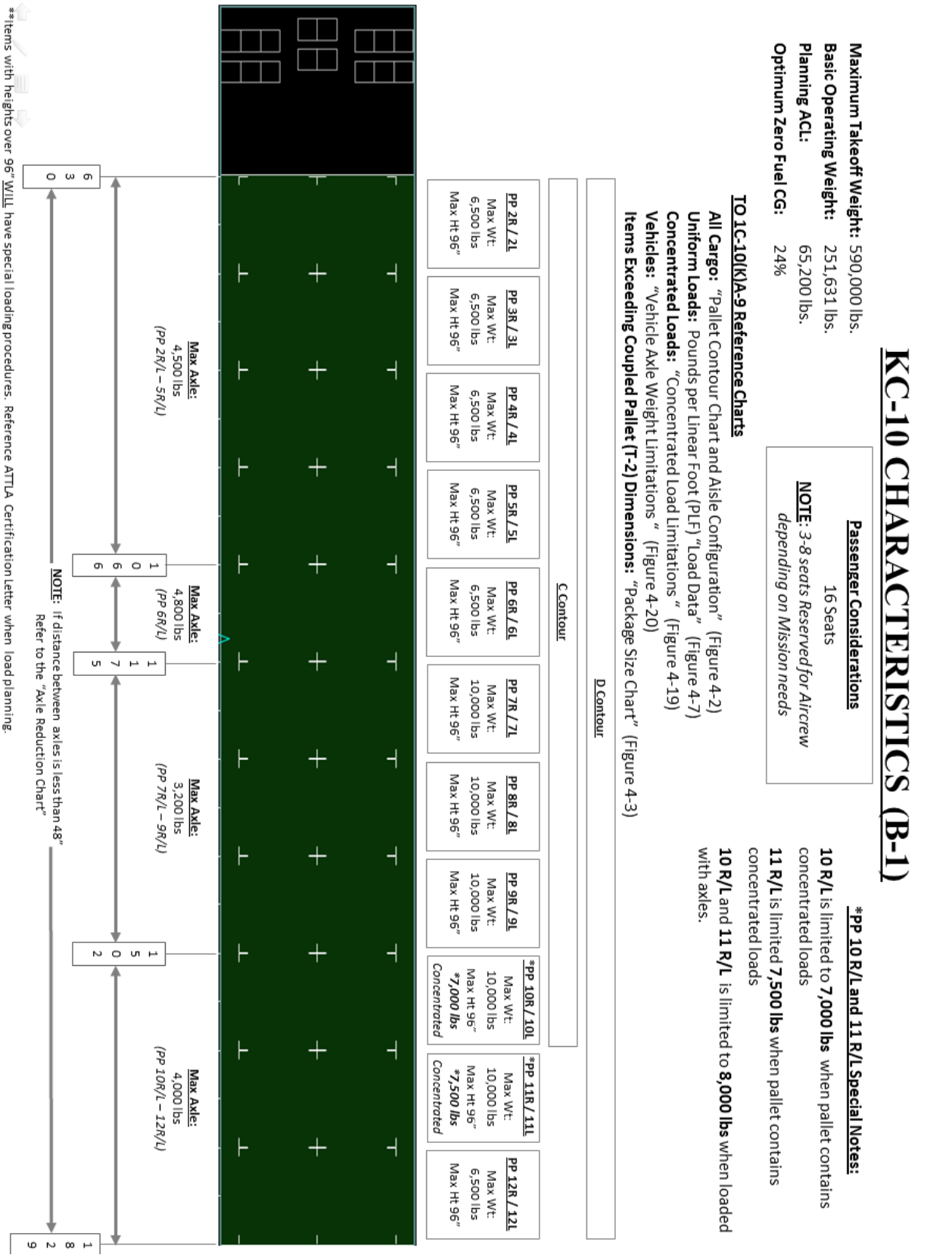


Figure 6.18. KC-10 Floor Schematic (Bravo Configuration)

KC-10 CHARACTERISTICS

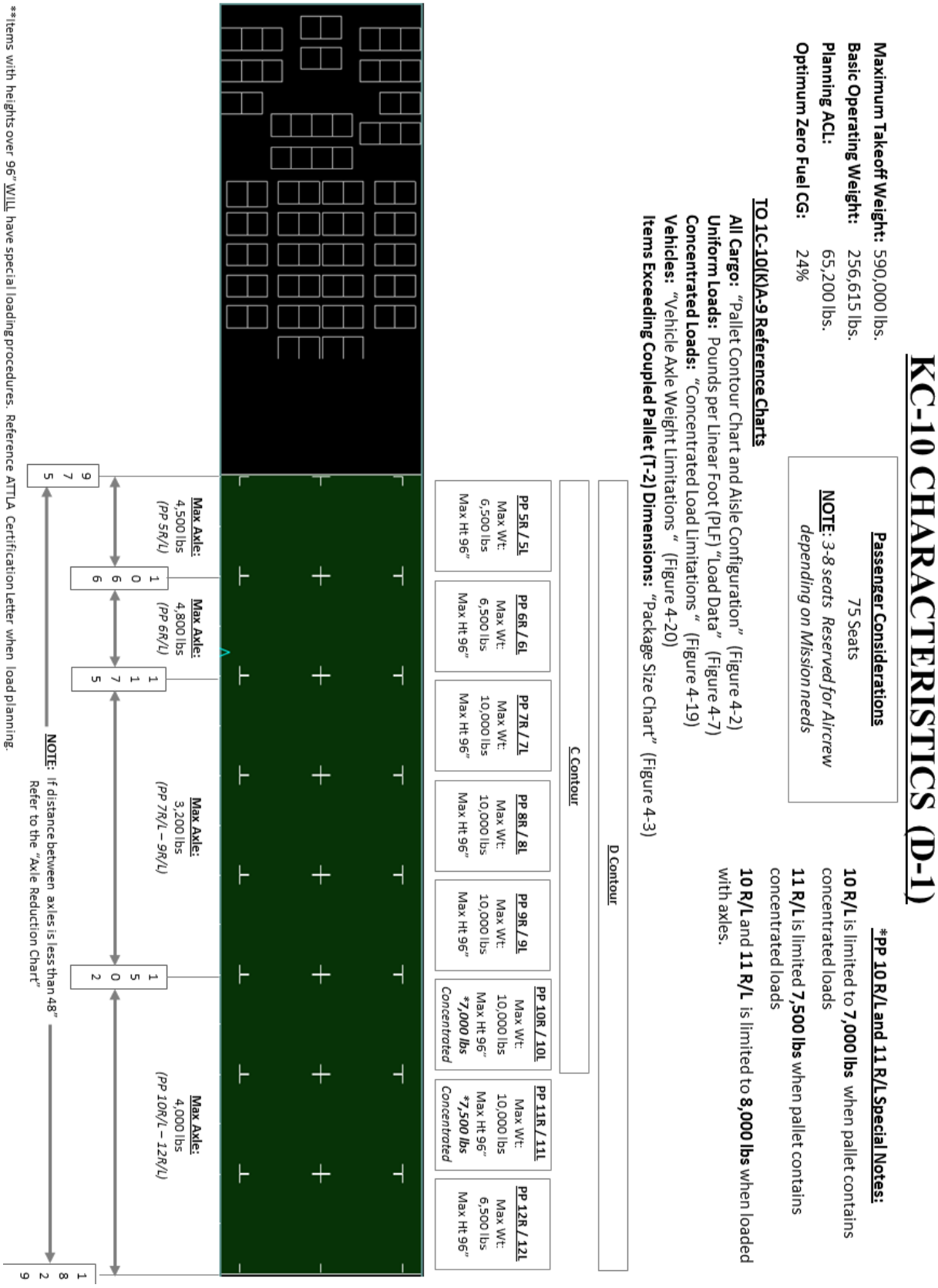


Figure 6.19. KC-10 Floor Schematic (Delta Configuration)

KC-10 CHARACTERISTICS

KC-10

Maximum Takeoff Weight: 590,000 lbs.
Normal Operating Weight: 255,000 lbs.
Peacetime Planning ACL: 65,200 lbs.

OPTIMUM FUEL PLANNING CB: 24% Mean Aerodynamic Chord (MAC)
(Aircraft + Cargo Weight)

CARGO COMPARTMENT: Length - 1198 inches
Width - 197 inches (Note 1)
Height - 96 inches

CARGO AREA: Main Cargo Floor: FS 630 - 1828 (Code B)
FS 957 - 1828 (Code D)

MAXIMUM SINGLE AXLE WEIGHT:

2 - 5 L/R: 4,500 lbs. 6 L/R: 4,800 lbs. 7 - 9 L/R: 3,200 lbs. 10 - 12 L/R: 4,000 lbs.
Above represent at least 48" tire separation; see Axle Reduction Chart if separation is less. When loaded with multiple axles (48” separation), pallet positions 10 - 11 L/R are limited to 8,000 lbs.

PALLETIZED CARGO LOADING:
(Weights include cargo, pallet and nets)

Max Gross Weight:
Uniform 2 - 6 L/R: 6,500 lbs. 7 - 11 L/R: 10,000 lbs. 12 - 13 L/R: 6,500 lbs.
Concentrated same as Uniform except: 10 L/R: 7,000 lbs. 11 L/R: 7,500 lbs.
Wheeled same as Uniform except: 10 - 11 L/R: 8,000 lbs.

Height: 2 - 10 = 96 inches -- Contour “C”
Height: 11 - 12 = 96 inches -- Contour “D”

Utilize Package Dimension Chart to calculate maximum cargo length when cargo exceeds usable dimensions of a two-pallet train

Package Dimension Chart

HEIGHT \ PACKAGE WIDTH	12"	24"	36"	48"	60"	72"	84"	96"	108"	120"	132"
0-36"	1,323	982	660	520	440	380	330	295	265	240	205
48"	1,266	900	620	500	430	370	330	290	260	230	200
60"	1,016	680	550	470	390	350	310	275	250	220	195
72"	740	600	490	410	360	320	280	255	230	205	180
84"	590	490	420	370	325	285	255	230	210	185	160
96"	490	420	370	325	285	260	235	210	185	170	145

PASSENGER LOADING:

Code B: 10 passengers
Code D: 69 passengers

When **10** or more passengers/troops are planned on the KC-10, baggage will be palletized.

Figure 6.20. KC-10 Fact Sheet

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KC-135 CHARACTERISTICS

chapter

7

AMC

Lesson Objective: The objective of this lesson is for each student to comprehend the characteristics of a KC-135 aircraft for load planning purposes.

References: T.O. 1C-135-9, Cargo Loading Manual
AFI 11-2KC-135 Volume 3, Addenda A
AFI 11-2KC-135 Volume 3, Chapter 13
DOD 4500.9-R Part III, Defense Transportation Regulation (DTR)
AMCI 24-101 Volume 11

Web Pages: http://www.transcom.mil/dtr/part-iii/

Learning Activities:

1. KC-135 Stratotanker
2. Dimensional planning factors
3. Weight/loading considerations
4. Pallet considerations
5. Passenger considerations
6. Configurations

Test Objectives:

1. Summarize the mission and the capabilities of the KC-135 aircraft
2. Give examples of weight, pallet, and passenger considerations when preparing to load plan a KC-135 aircraft
3. Describe the different configurations for the KC-135 aircraft

KC-135 CHARACTERISTICS

7.1. The KC-135 Stratotanker. The KC-135 Stratotanker is a dual role, long range, inter-theater (strategic) aircraft. The primary mission, as a tanker, enables the KC-135 to transfer up to 203,000 pounds of fuel, in-flight, utilizing the boom located on the tail section of the aircraft. Fuel is stored in the lower fuselage and wing tanks. In the secondary role as a transport, cargo and passengers are capable of being carried in the upper deck of the fuselage. This chapter explains the basic cargo capabilities, limitations, and unique loading requirements necessary for load planning the KC-135.

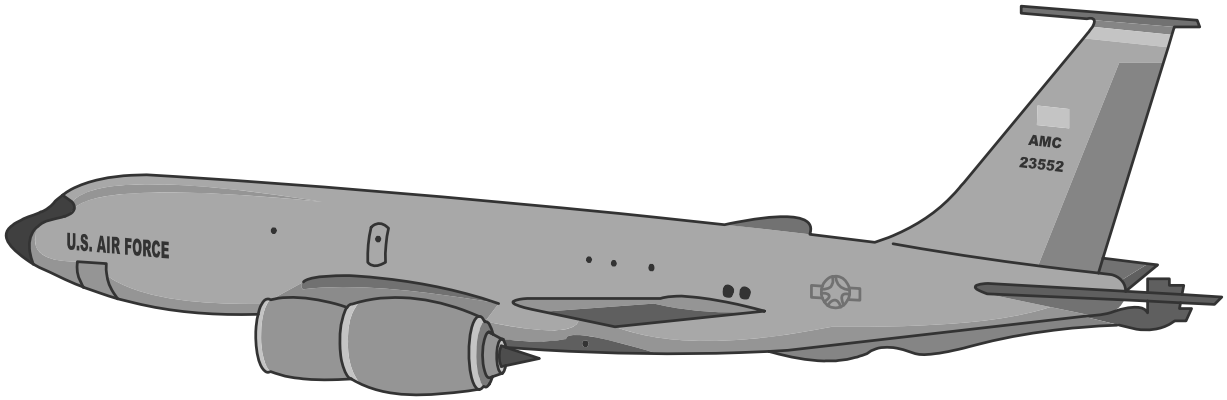

Figure 7.1. KC-135 Aircraft.

7.2. Dimensional Planning Factors. The cargo compartment is 840 inches long (F.S. 400 to F.S. 1240), 129 inches wide, and 84 inches high. The usable length is limited to 720 inches (F.S. 420 to F.S. 1140) by installed aircraft equipment. The usable width is limited to 120 inches by a bleed air duct at F.S. 610. The usable height is limited to 74 inches along the left side of the aircraft by a bleed air duct beginning at F.S. 610. In addition the cargo door dimensions limit cargo to a maximum of 78 inches high or 116 inches wide (cargo dimensions must be calculated using the package dimension chart in figure 7.3. to determine loadability).

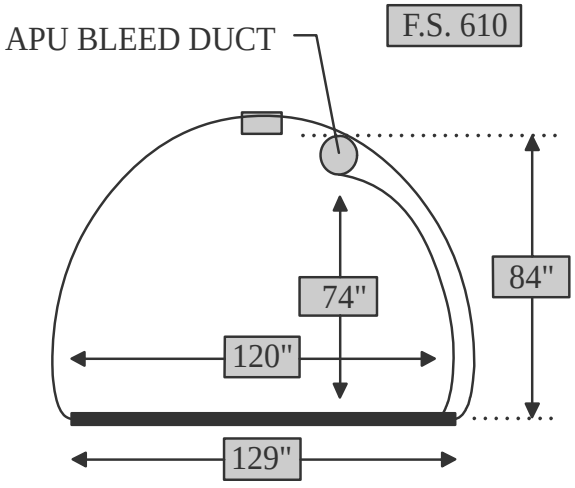

Figure 7.2. KC-135 APU Bleed Duct Diagram

KC-135 CHARACTERISTICS

PACKAGE LENGTH - INCHES	PACKAGE HEIGHT - INCHES				
	0 - 45	50	60	70	78
	PACKAGE WIDTH - INCHES				
0-130	116	112	103	87	68
140	108	102	96	80	63
150	99	95	90	75	59
160	95	90	84	70	55
170	89	85	79	66	51
180	85	81	75	63	49
190	80	76	71	59	45
200	76	73	67	56	43
210	72	69	63	53	40
220	68	66	60	51	38
230	65	62	57	48	36
240	62	60	55	47	34
250	59	57	51	45	32
260	57	55	50	43	31
270	55	52	47	41	29
280	53	50	46	40	28
290	51	48	44	38	27
300	49	47	42	37	26
310	48	45	41	36	25
320	47	44	40	35	24
330	45	43	37	34	24
340	44	41	38	34	23
350	43	40	37	33	23
360	42	39	36	32	22
370	41	39	35	31	21
380	40	38	35	31	21
390	39	37	34	30	20
400	38	37	33	30	20
410	38	36	33	29	20
420	37	35	32	29	- -
430	36	34	32	29	- -
440	35	33	31	28	- -
450	35	33	31	28	- -
458	34	33	30	28	- -

Figure 7.3. KC-135 Package Dimension Chart

KC-135 CHARACTERISTICS

7.3. Weight/Loading Considerations. Weight limitations are absolutely critical for safe flight. The normal planning ACL is 30,000 pounds. Heavier loads are possible provided you coordinate in advance with your affiliated AMCU.

7.3.1. **Floor Loading**. The floor in the KC-135 consists of 3/8" plywood panels laid across a structure of supporting beams. A minimum of 3/4" plywood shoring must be used when moving or placing items of cargo that may puncture or damage the cargo floor (rolling and parking shoring). Dollies, Pry Bars, etc. will always be shored to move cargo. Shoring will normally be laid out in full sheets.

7.3.2. **Compartment Loading Limitations**. The maximum weight that can be placed at a specific location in the KC-135 cargo compartment is limited by the structural ability of the aircraft to withstand the load at that point. To determine this limitation we divide the cargo area into compartments. A compartment is the length from one given fuselage station to another and spans the width of the cargo compartment. These compartments are labeled "D" through "N" on the KC-135 and are 60 or 80 inches in length. The weight in a single compartment is the total weight of the cargo, shoring, passengers, and baggage placed in that compartment. This total weight must not exceed the maximum for that compartment. See figure 7.4. for a complete listing of compartments and limitations.

COMPARTMENT	LIMITS OF COMPARTMENTS	MAXIMUM WEIGHT (POUNDS)	
D	F.S. 420 - F.S. 480	6000	
E	F.S. 480 - F.S. 540	6000	
F	F.S. 540 - F.S. 620	8000	
G	F.S. 620 - F.S. 680	5340	SEE NOTE 2
H	F.S. 680 - F.S. 740	5340	SEE NOTE 2
I	F.S. 740 - F.S. 820	7120	SEE NOTE 2
J	F.S. 820 - F.S. 900	8000	
K	F.S. 900 - F.S. 960	6000	
L	F.S. 960 - F.S. 1020	4200	
M	F.S. 1020 - F.S. 1080	4200	
N	F.S. 1080 - F.S. 1140	4200	

NOTES:

1. *These weights reflect the total weight of passengers, baggage, cargo, and shoring placed in the compartment.*

2. *The maximum weights for G, H, and I compartments may be increased with the concurrence of the boom operator or owning unit up to a maximum of: G-8,400 lbs., H-8,400 lbs., and I-11,200 lbs.*

Figure 7.4. KC-135 Compartment Limitations

7.3.3. **Shoring.** Shoring will normally be applied in full sheets. You must ensure that shoring does not cover areas of the cargo floor, which provide emergency access to aircraft systems (F.S. 820 to F.S. 900: Shaded no load areas on the cargo manifest). You must also ensure that enough tiedown rings remain uncovered to secure the item in the aircraft.

NOTES:

1. *Shoring will be laid down for rolling stock so that no wheel lies within 6" of the edge of the shoring (rolling and parking).*
2. *A full sheet of plywood must be used and laid laterally between F.S. 590 to F.S. 638 and between F.S. 790 to F.S. 838. The floor beams are not continuous in this area and this procedure must be used to ensure sufficient strength.*
3. *From F.S. 360 to F.S. 810 and from F.S. 960 to F.S. 1240 floor beams run longitudinally, requiring bridge shoring to be placed laterally. From F.S. 830 to F.S. 960 floor beams run laterally, requiring bridge shoring to be placed longitudinally.*

7.4. Pallet Considerations.

7.4.1. **463L Cargo Roller Handling System.** The 463L Cargo Roller Handling System will be installed in the floor fittings of KC-135 aircraft when required. This configuration must be coordinated in advance, as the system is not installed on all missions. The system is capable of transporting up to six 463L pallets loaded longitudinally (88" side is the front and rear of the pallet). The system consists of the following components. Sill protectors to prevent damage to the cargo door locking mechanisms. Omni-directional roller mat assemblies at the cargo door area to facilitate aligning palletized items into the rails. Rail assemblies to guide and secure the pallets and roller assemblies to facilitate movement on the cargo floor.

7.4.2. **Pallet Limitations.**

7.4.2.1. The maximum gross weight of a single 463L pallet is 6000 pounds.

7.4.2.2. The maximum pallet height is 65 inches from the pallet surface. The pallet must be contoured to fit the aircraft for loads exceeding 50" in height (See figure 7.5.).

7.4.2.3. Cargo will not overhang the usable dimensions (84" by 104") of the 463L pallet.

KC-135 CHARACTERISTICS

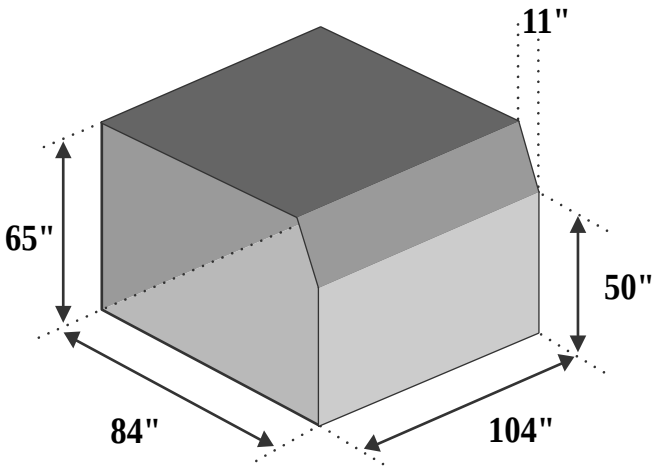

Figure 7.5. Cargo Contour

7.4.2.4. The normal pallet positions are F.S. 505, F.S. 615, F.S. 725, F.S. 835, F.S. 955, and F.S. 1065 (pallet positions 1 - 6 respectively). When there are less than 6 pallets, a pallet may be moved in 10-inch increments, provided the front edge of the pallet is not located at F.S. 730, F.S. 740, or F.S. 930. Pallets must never cover the main landing gear viewing doors at F.S. 900 (shaded no load zones on cargo manifest).

7.5. Cargo Jettison. The aft emergency escape hatch located on the right side of the aircraft at F.S. 1160 is used for inflight jettison of cargo. The size of the hatch limits items to be jettisoned to no more than 20” X 48”. Hazardous liquids, acids, or other material that could leak posing a threat to the aircraft will be packaged in containers smaller than 20” X 48”. Other hazardous materials that do not leak are not limited in size by this restriction. Hazardous cargo should be placed so as to be readily accessible during flight and as close to the aft hatch as possible if it can be jettisoned.

NOTE: *Lithium batteries classified as hazardous by AFMAN 24-204 will not be offered for shipment on the KC-135 unless the shipper provides a class D fire extinguisher.*

7.6. Passengers Considerations.

7.6.1. Airline Type Seating. This configuration must be coordinated in advance. With the maximum number of seats installed there is extremely limited space available for baggage and cargo. The number of seats must be reduced to accommodate any significant amount of cargo or baggage.

7.6.2. Troop seats. There are provisions for passengers in permanently installed sidewall troop seats. This configuration allows baggage to be centerline loaded in the cargo compartment.

KC-135 CHARACTERISTICS

7.6.3. Passengers with pallets. With the 463L roller system installed, placarded pallet height and number of pallets carried restrict passenger seating. The following charts list the number of passengers that can be safely carried.

SEAT RELEASE **WITHOUT** PASSENGER SEAT PALLET

NUMBER OF CARGO PALLETS	PASSENGERS PERMITTED
6	0
5	10
4	15
3	20
2	25
0 OR 1	30

SEAT RELEASE **WITH** PASSENGER SEAT PALLET

NUMBER OF CARGO PALLETS	PASSENGERS WITH ALL PALLETS ABOVE 50"	PASSENGERS WITH ANY PALLETS LESS THAN 50"
5	N/A	10
4	10	15
3	20	20
2	25	25
0 OR 1	30	30

Figure 7.6.

NOTES

1. *Extra crewmember required for any mission with passengers.*

2. *If in the Aircraft Commander's judgment, pallet configuration provides additional (sufficient) aisle space, troop seats adjacent to the cargo pallets may be used.*

7.6.3.1. Passengers will be seated 30 inches forward or along side palletized cargo. All baggage, except small carry-on items, will be palletized for 20 or more passengers.

7.6.4. Passengers beside non-palletized cargo. Because passengers and cargo share the same area in the cargo compartment, the width of the cargo will affect the availability of seats.

The following rules will apply:

1. Cargo widths up to 52": Passengers seated on both sides, the cargo is center-lined.

2. Cargo widths more than 52" up to 84": Passengers seated on the left side, provided the cargo is offset to the right side (Ensure cargo fits pallet width profile).

3. Cargo widths greater than 84": No passengers seated beside cargo.

KC-135 CHARACTERISTICS

7.7. Cryogenic Vents. Liquefied gases such as Liquid Oxygen (LOX), Liquefied Nitrogen (LIN), etc., require venting to the outside of the aircraft during flight to allow the pressure in the tank to remain in safe limits as the aircraft's altitude changes. There are two pairs of vents. One set is located on the right side of the aircraft, forward of the aft escape hatch (F.S. 1100). The other set is located on the left side of the aircraft, behind the APU (F.S. 1200). Cargo requiring venting will be positioned near these vents.

7.8. Configurations. Two of the more common KC-135 configurations used without the 463L roller kits are shown in figures 7.7., and 7.8.

NOTE: *Seating figures listed are the number of seats associated with the configuration. Available seating is based upon the total number of crew present in the cargo compartment.*

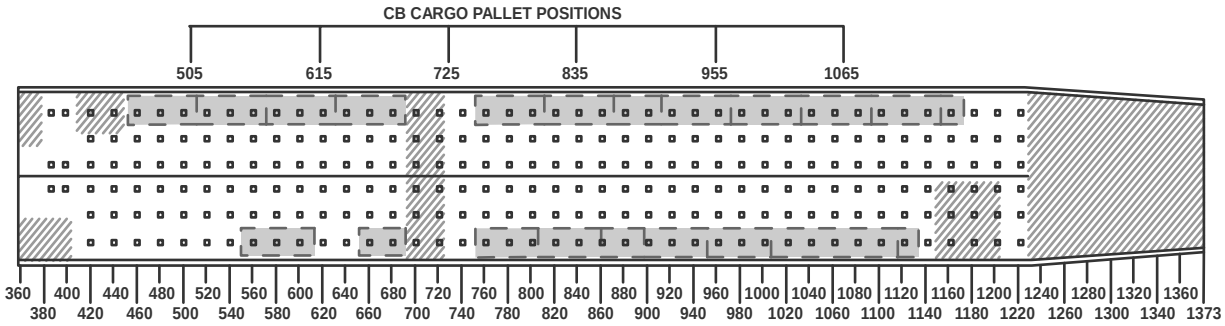

Figure 7.7. KC-135 Standard Configuration (Slick floor and 57 seats)

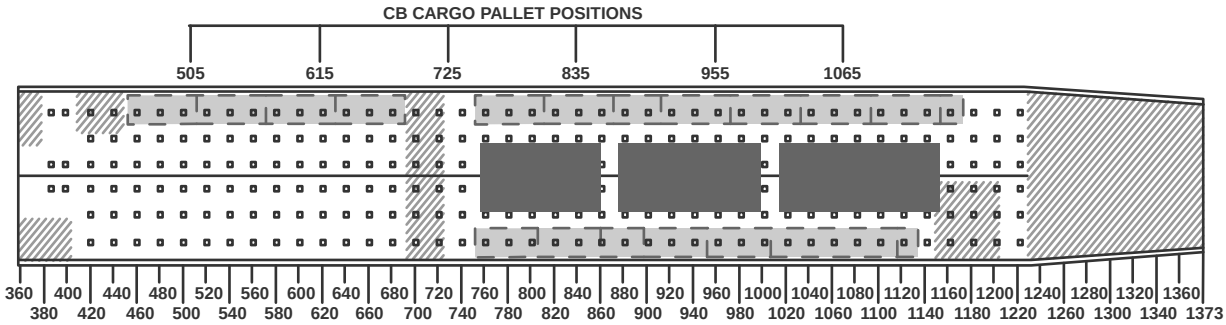

Figure 7.8. KC-135 Tanker Task Force Configuration

KC-135 CHARACTERISTICS

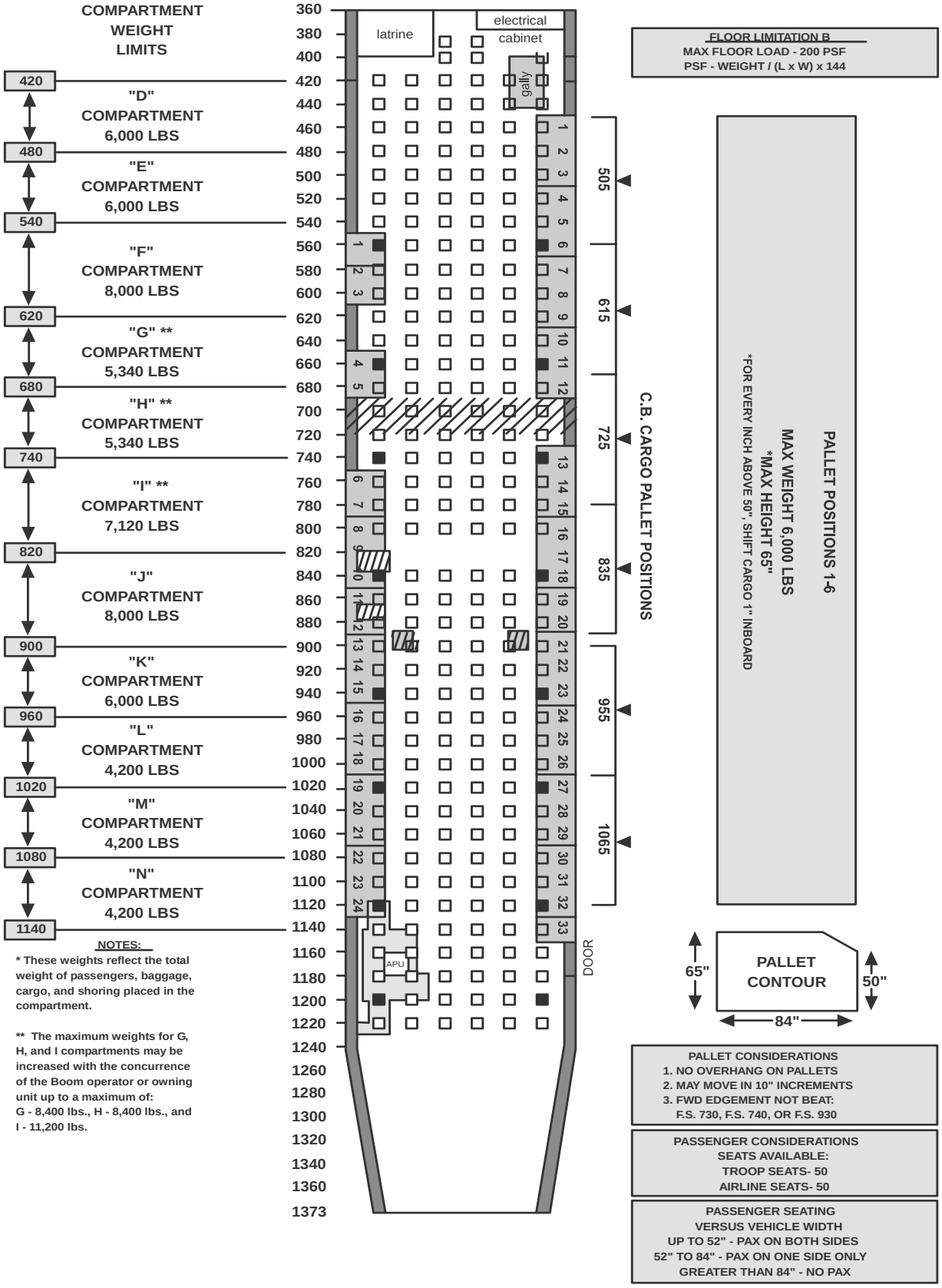

Figure 7.9. KC-135 Floor Schematic

KC-135 CHARACTERISTICS

KC - 135

Length:	1,013 inches
Usable Length:	720 inches
Width:	129 inches (at floor level)
Height:	84 inches (at aircraft centerline)
Planning ACL:	30,000 pounds
Pallet Positions:	6
Pallet Weight Limitations (1-6):	6,000 pounds
Pallet Height Limitation:	65 inches (Note 1)
Cargo Door Dimensions:	117 inches wide x 78 inches high

NOTE:

1. Measured from the surface of the pallet. Cargo must not be loaded within 6 inches of any aircraft structure. For every inch taller than 50 inches, cargo must be set inboard one inch from the right side of the pallet to a maximum height of 65 inches.

Figure 7.10. KC-135 Fact Sheet

COMMERCIAL AIRLIFT

chapter

8

AMC

Lesson Objectives: The objective of this lesson is for each student to know the different types of commercial airlift available that support contingency operations.

References: AMCPAM 24-2 Vol 1
DOD 4500.9-R Part III, Defense Transportation Regulation (DTR)

Web Pages: http://www.transcom.mil/dtr/dtrHome/

Learning Activities:

1. Contract Airlift
2. Civil Reserve Air Fleet (CRAF)
3. Aircraft Types
4. Load Planner Responsibilities
5. Associated Problems

Test Objectives:

1. Name the types of commercial airlift available
2. List the various types of aircraft associated with commercial airlift
3. List some problems associated with commercial aircraft
4. Identify the responsibilities of a load planner when dealing with commercial aircraft

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8.1. The Civil Reserve Air Fleet (CRAF). CRAF is a voluntary contractual program where civil carriers agree to augment military airlift during a crisis in exchange for peacetime defense business. During peacetime, regional contingencies, and major exercises. CRAF carriers are contracted daily to fly various categories of airlift, to include regularly scheduled passenger and cargo movement known as channel missions, Special Assignment Airlift Missions (SAAMs), and charter airlift. This support is crucial to AMC's customers, giving AMC the capacity to continue to meet routine scheduled and surge commitments simultaneously. Incremental activation of CRAF provides AMC the flexibility to meet these requirements. It is highly recommended that units contact their affiliated AMCU as soon as possible for planning assistance anytime a CRAF aircraft is scheduled. The final responsibility for load planning commercial aircraft rests with the specific carrier. See AMCPAM 24-2 Vol 1, CRAF Load Planning Guide for general planning guidance. Specific guidance related to the capabilities and limitations associated with a specific type of commercial aircraft may be obtained by contacting the appropriate carrier by telephone. Telephone numbers in this pamphlet are current at the time of printing. For an updated listing, contact HQ AMC/A3BC, DSN 779-1751, during normal duty hours.

8.1.1. Airframes pledged to the CRAF are activated in three progressive stages with each stage providing additional airlift capacity. These stages include, Stage 1- minor regional crisis, Stage 2-major regional crisis, and Stage 3-national mobilization.

NOTE: ***USTRANSCOM CC (Commander, United States Transportation Command), with approval of the Secretary of Defense, is the activation authority for each stage of the CRAF.***

8.1.1.1. Once a mission has been assigned, carriers have 24 hours to position Stage I or II aircraft at the on-load station with enough fuel to make the next stop. Stage III aircraft have 48 hours to respond. For aeromedical aircraft, the carriers have 48 hours to reconfigure the first B767 into a baseline configuration where the contractor installs the conversion kit (known as the Aeromedical Evacuation Ship Set, or AESS). Installation requires about 12 hours, so additional B767 aircraft should arrive at 12 hour intervals after that. Contractor can convert 3 aircraft at a time.

8.1.1.2. The DOD tasks the minimum percentage of assets in each stage necessary to augment military airlift to meet crisis requirements. During activation, the civil carriers retain operational control of their aircraft while AMC TACC exercises mission control.

8.1.2. Stage I – Minor Regional Crisis. Long-range international airlift capability committed to the Commander Air Mobility Command (AMC CC). It can be used to perform airlift services when AMC organic airlift capability cannot meet both deployment and other airlift requirements simultaneously. Peacetime procedures remain in effect.

8.1.3. Stage II – Major Regional Crisis. Airlift expansion identified for an airlift emergency involving partial national mobilization.

8.1.4. Stage III – National Mobilization. Provides for the total CRAF capability to be made available for major military emergencies warranting a full mobilization of United States forces.

8.2. General Description of the B-747. The B747 is a wide-body aircraft flown by US and foreign airlines in passenger, and cargo configurations. The B747 is normally contracted to carry from 364-461 passengers or 180,000 pounds (90 tons) of cargo. The actual passenger or cargo maximum capability will vary based on series and individual aircraft configuration. For war planning, use 401 seats for passengers or troops and 90 tons for cargo. B747-100F, 200F and 400F are cargo aircraft with 33 or 37 pallet positions on the main deck (figure 8.1.). The 100F has a side cargo door. The 200F and 400F have a nose and side door. B747-100B, 200B and 400B are all passenger aircraft. Main Deck B747 Passenger Arrangement: The number of passenger seats available will vary by series of aircraft, carrier spacing of seats, and contract requirements. A general planning factor is 360 seats for peacetime operations or 340 during CRAF activation on the passenger B747s. The contract seating for the B747 normally is 390 or 461, depending on configuration, even though fewer or more seats may be available on carrier-specific aircraft.

8.3. General Description of the DC-10. The McDonnell Douglas DC-10 is a wide-body jet flown by domestic and foreign airlines in both passenger and cargo configurations. The DC-10 comes in three different variants or series and within these series are different configurations of passenger and cargo. These three series are the “dash” 10, 30 and 40 aircraft, are (passenger carrying), the “CF” (convertible/freight), and the “F” (Freighter) series. The DC-10 can carry up to 380 passengers or 176,000 pounds of cargo. However actual passenger and cargo capabilities vary by aircraft series and configuration. The DC-10-30F has been permanently converted to the freighter version, which has an increased payload and greater interior dimensions on the main deck (figure 8.2.). The actual number of seats available on the DC-10 aircraft varies depending on the series of aircraft and carrier spacing of seats. Historically, 30 -series DC-10s are commonly used for exercises because of greater payload-range performance and are configured at 250 seats. EXCEPTION: 380 seats may be available on some DC-10s; however, loading over 354 troops might exceed the guaranteed allowable cabin load (GACL) and reduce aircraft range. DC-10 cargo-capable aircraft have a side door located on the forward left side of the aircraft. **Main Deck Pallet Configuration**, maximum load on the main cargo floor is limited to 75 pounds per square foot: therefore, all cargo on the main deck must be palletized, positioned on a pallet, or shored with a subfloor. Normally, the pallet subfloor consists of standard 463L pallets; shoring consists of wood at least 2 inches thick, or two layers of ¾- inch plywood. The DC-10 freighters have a 30 pallet 463L configuration. **Lower Lobe Compartments**, the DC-10 has three lower lobe compartments: Forward lower lobe (FLL), center lower lobe (CLL), and aft bulk compartment (ABC). The length of each compartment varies depending on type and model.

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8.4. General Description of the DC-8. Variations depend upon aircraft series, spacing of the seats, individual aircraft configurations, and contract requirements. In general, the DC-8-62F/CF has 14 pallet positions, and the DC-8-61CF, DC-8-63F/CF, DC -8-71CF, DC-8-73F/CF have 18 pallet positions (figure 8.3.). Door size and rounded contour of the floor limits the lower lobes to loose baggage or small cargo or equipment. A main deck pallet subfloor is required for rolling stock.

NOTE: *Users are encouraged to limit the main deck only to bulk, single-pallet cargo. The transport of rolling stock requires carrier authorization and guidance. The actual number of seats available on the DC-8 varies by model and spacing requirements. HQ AMC/DOYA normally contracts for 110 passengers when requesting commercial aircraft for exercises and contingencies. This number also applies to users of the DC-8 when estimating the applicability of an aircraft for their exercises. The maximum payload is computed without regard to cargo density and is limited by aircraft structural limitations. In general, DC-8s are most effectively used to haul palletized bulk cargo.* ***Main Deck Pallet Configuration****, due to floor limitations, all military cargo on the main deck must be palletized or on a palletized or shored subfloor. Normally, the subfloor consists of standard 463L pallets or wooden boards at least 2 inches thick.* ***Lower Lobe Compartments****, the DC-8 has two cargo compartments in the lower level. The front lower compartment and aft lower compartments have two access doors with a divider in each. This divider may be moved, depending on the particular aircraft configuration. The lower compartments have a rounded belly and cannot be loaded with pallets. The compartments are usually loaded with small, hand transportable cargo items or baggage. These items may be loaded directly onto the floor of the DC-8. (****EXCEPTION:*** *Heavyweight items such, as toolboxes should not be placed directly on the floor.) Maximum floor weight bearing capability is 120 pounds per square foot.*

8.5. General Description of the L-1011. The Lockheed L-1011 is a wide-body, long-range, tri-jet passenger aircraft. The L-1011 is normally configured to carry from 246-330 passengers. Variations on passenger seats depend upon aircraft series, location of galley, spacing requirements of the seats, and contract requirements. A cargo version of the basic L-1011-1 (S/N 1012) was made available for military use in 1995 along with eight former British aircraft that were converted to the cargo configuration. Passenger configuration and seating capacity vary greatly by aircraft series, model, and individual carrier. The Joint Service Capabilities Plan (JSCP) uses 145 passengers per airplane for the L-1011-100 and 205 passengers for the L-1011-500 for wartime planning based on 400 pounds per individual over a 3500 NM leg. The –200 F series is the only freight carrying L-1011 in the CRAF inventory. The Main Cabin Cargo Compartment can accommodate 26 463L 88” X 108” pallets when built to fit within the contour of the aircraft fuselage (figure 8.4.).

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8.6. General Description of the B-767. The Boeing 767 is a twin engine, wide body aircraft capable of long-range international operations. Currently, it is capable of fulfilling a dual role, one role for passenger/cargo transport and the other for long-range Aeromedical evacuation by the addition of an Aeromedical Evacuation Ship Set (AESS). Contracted seat capacity ranges from 152-207 passengers, based on the model and carrier configuration. The B767 has three lower lobe compartments. Passenger baggage will be loaded by hand. There is no capability to load or secure 463L pallets in the lower compartments. The B767-200 provides either an 87 litter with 41 ambulatory or crew seat capability or an expanded litter capability (111 litter maximum) with reduced ambulatory or crew seating. The B767-300 provides either 111 liters with 30 ambulatory or crew seat capability or a reduced litter capability (87 litter minimum) with increased ambulatory or crew seating. The B-767 is obligated for passenger and Aeromedical Evacuation only.

8.7. General Description of the B-777. The B777 is a two-engine, wide body aircraft with long-range capability and a 4000 nautical mile range. The 777 family is designed to fill the size gap between the 767 and 747. The market-driven 777-200 twinjet seats from 305 to 328 passengers in a typical three-class configuration. The initial 777-200 has a range of up to 5,925 miles. The 777-200ER (extended range) model is capable of flying the same number of passengers up to 8, 861 miles. The latest 777 derivative is the 777-300, a stretched version that provides seating for 328 to 394 passengers in a typical three-class configuration. The 777 family of airplanes consists of passenger versions only. The near future will bring freighter versions into the cargo arena and their data will be incorporated into this guide at that time.

8.8. General Description of the MD-11. The McDonnell Douglas MD11 is a long-range wide body cargo aircraft in the inventory of the CRAF. There are passenger and cargo versions of the MD-11 available for military use. The aircraft is basically an extended version of the DC-10. The MD-11 is capable of carrying upwards of 410 passengers depending on the configuration of the aircraft and any limitations driven by local airport conditions such as weather, runway length etc. However the contracted number of passengers is 255. This number may be increased or decreased by the carrier. The aircraft is capable of transporting up to 35 military pallets. As with the DC-10, the MD-11 also requires that adherence to cumulative shell zone capacities be considered during pallet selection and placement. The Forward Lower Lobe compartments of all MD-11s can accommodate as many as six 463L cargo pallets. Some models have a larger modified Aft Lower Lobe Cargo Door that can accommodate four extra 463L pallets on the floor. For general planning, plan single-pallet bulk only cargo for the MD-11 aircraft. The transport of wheeled vehicles should only be considered as a result of carrier-user coordination.

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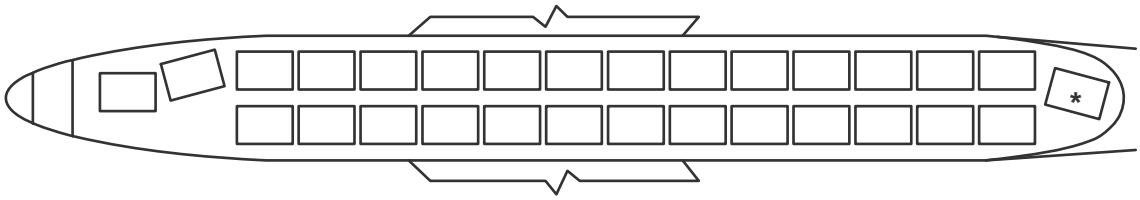
8.9. General Description of the A-310. The Airbus A310 is a wide-body, long-range, passenger aircraft. The A310 is normally configured to carry from 191-279 passengers. Variations on passenger seats depend on aircraft series, location of galley, spacing requirements of the seats, and contract requirements. There is no cargo conversion of the A310 available for military use. Passenger configuration and seating capacity vary greatly by aircraft series, model and individual carrier. The JSCP uses 180 passengers per airplane for the A310 for wartime planning, based on 400 pounds per individual over a 3,500 nautical mile leg. The A310 has three lower lobe compartments: forward lower lobe (FLL), center lower lobe (CLL), and aft bulk compartment (ABC). The size of these compartments and access doors vary with aircraft model and series. There is no restraining mechanism available to secure 463L pallets, and the user should plan to bulk load all available compartments.

8.10. General Description of the B-757. The B757 is a two-engine, narrow body aircraft with short-field takeoff and landing capability and a 4000 nautical mile range. The 757 family of airplanes consists of a passenger version and a package freighter version. The passenger version is available in two configurations. The basic configuration (overwing-exit) has three LH and RH passenger doors and two LH and RH overwing exit doors. An optional configuration (four-door) has the same three LH and RH passenger doors but with one LH and RH exit door aft of the wing, in lieu of the overwing exit doors. The number of seats varies with aircraft configuration. The 757 can typically carry 186 passengers in a six-abreast, mixed-class configuration over a 2,900-nautical-mile range with full load. High gross weight aircraft can increase the range to about 3,900 nautical miles. High density seating arrangements can accommodate as many as 239 passengers in an all-economy configuration. HQ AMC/A34A normally contracts for 190 passengers when requesting commercial aircraft for exercises and contingencies. The B757-200 Freighter main deck can accommodate 15 commercial containers. A forward and aft lower lobe provides space for bulk loads. A 134 x 86 inch main deck cargo door permits loading using existing commercial and military cargo handling systems. The lower deck bulk cargo areas can be loaded by hand or some aircraft are equipped with a telescoping cargo handling system.

NOTE: *Although there are no provisions at this time to put 463L pallets on the B-757, the option for future modifications exist and should this happen, those changes will be incorporated in a future change.*

8.11. Load Planning. Planners need to realize that, unlike military cargo aircraft, which are standardized, civilian airframes vary widely. It is not uncommon that notable variations occur between the same type, model, and series of civil aircraft, depending upon the needs of the carrier. Specific information (such as the number of passenger seats) may not be known until a specific aircraft arrives at the onload station. For detailed information on load planning the CRAF aircraft, refer to AMCPAM 24-2 Vol 1. Figures 8.5., 8.6. and 8.7. have been provided for additional planning information. The contracted carrier maintains final authority with regard to cargo loads planned for their aircraft. Contact HQ AMC/A3BC (DSN 779-1751) for the current telephone listing of specific carriers.

COMMERCIAL AIRLIFT

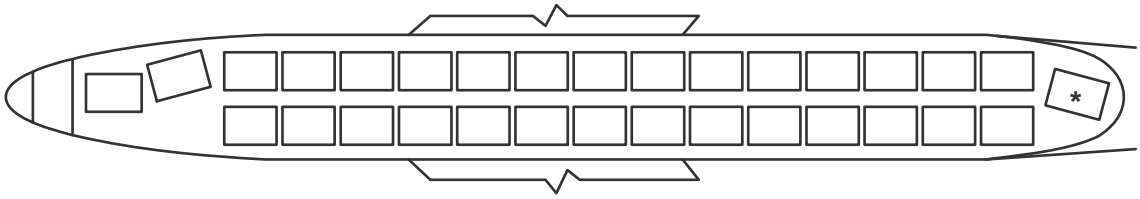


29 PALLETS
96 BY 125 BY 96 IN. (2.44 BY 3.18 BY 2.44 M)

630 CU FT (18.0 CU M) EACH
MGW 15,000 LB (6,810 KG) EACH**
TOTAL 17,640 CU FT (498 CU M)

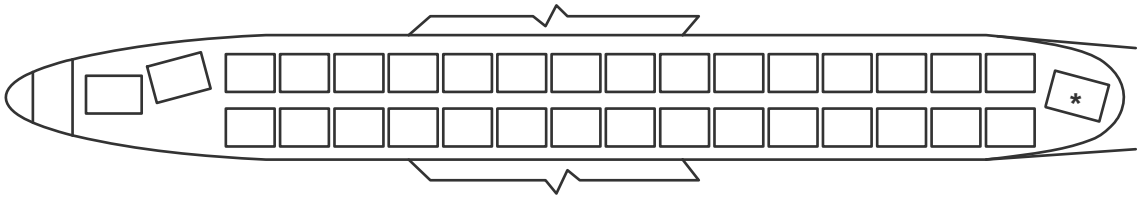
29 PALLETS
88 BY 125 BY 96 IN. (2.23 BY 3.18 BY 2.44 M)

560 CU FT (16.4 CU M) EACH
MGW 15,000 LB (6,810 KG) EACH**
TOTAL 16,240 CU FT (498 CU M)



31 PALLETS
96 BY 117.75 BY 96 IN. (2.44 BY 2.99 BY 2.44 M)

685 CU FT (16.6 CU M) EACH
MGW 12,500 LB (5,675 KG) EACH**
TOTAL 17,550 CU FT (497 CU M)



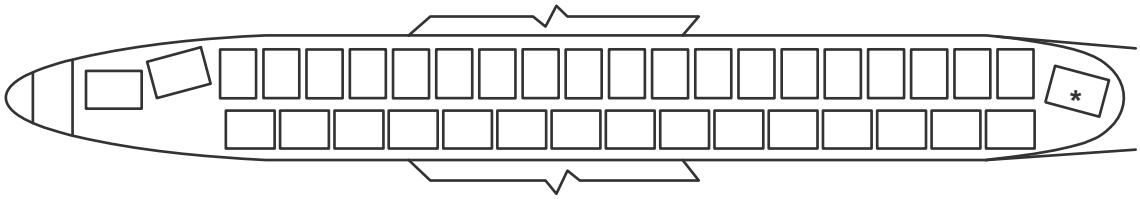
33 PALLETS
88 BY 108 BY 96 IN. (2.23 BY 2.74 BY 2.44 M)

(COMMERCIAL)

498 CU FT (14.1 CU M) EACH
MGW 13,000 LB (5,902 KG)**
TOTAL 15,936 CU FT (450 CU M)

(MILITARY)

490 CU FT (13.9 CU M) EACH
MGW 13,000 LB (5,902 KG)**
TOTAL 15,680 CU FT (443 CU M)



37 PALLETS
88 BY 108 BY 96 IN. (2.23 BY 2.74 BY 2.44 M)
(MILITARY)
490 CU FT (13.9 CU M) EACH
MGW 13,000 LB (5,902 KG)**
TOTAL 17,640 CU FT (498 CU M)

***** **OPTIONAL CAPABILITY, STANDARD ON 747-200F.**

****** **MAXIMUM GROSS WEIGHTS (MGW) ARE BASED ON MAXIMUM MAIN-DECK RUNNING LOAD CAPABILITY OR CURRENT CARGO MODULE SPECIFICATION UNIT.**

INTERIOR ARRANGEMENTS - MAIN DECK, PALLETIZED CARGO
MODELS 100, 200 AND 400 SERIES

-100, -200 AND -400 Series

Figure 8.1. B-747 Pallet Alignment

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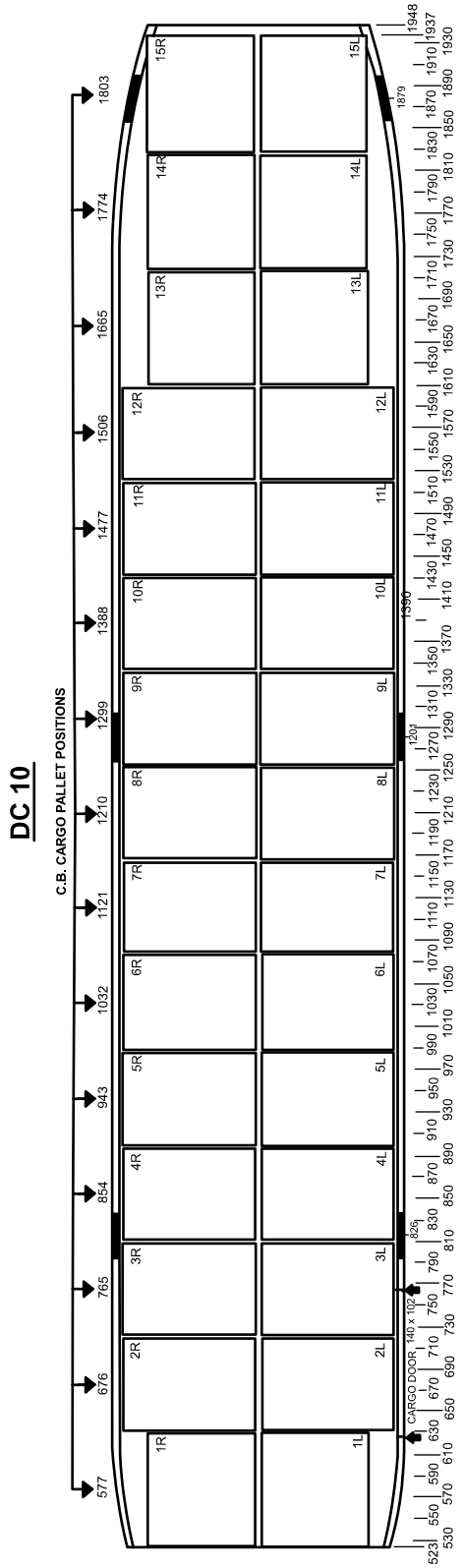

Figure 8.2. DC-10 Pallet Alignment

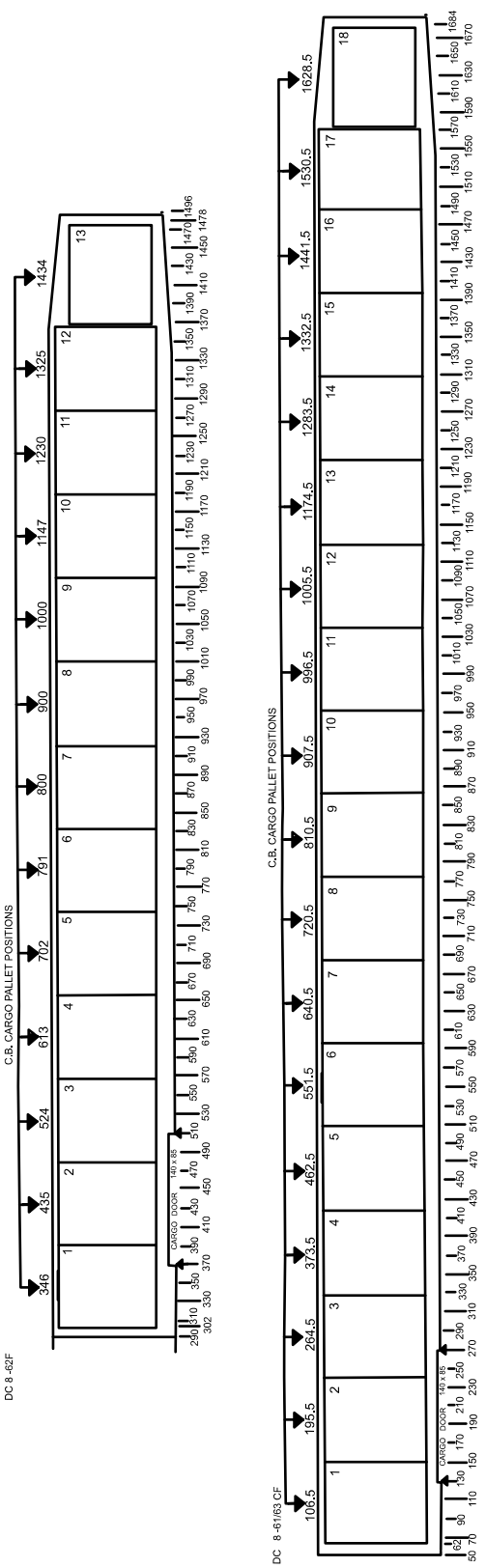

Figure 8.3. DC-8 Pallet Alignment

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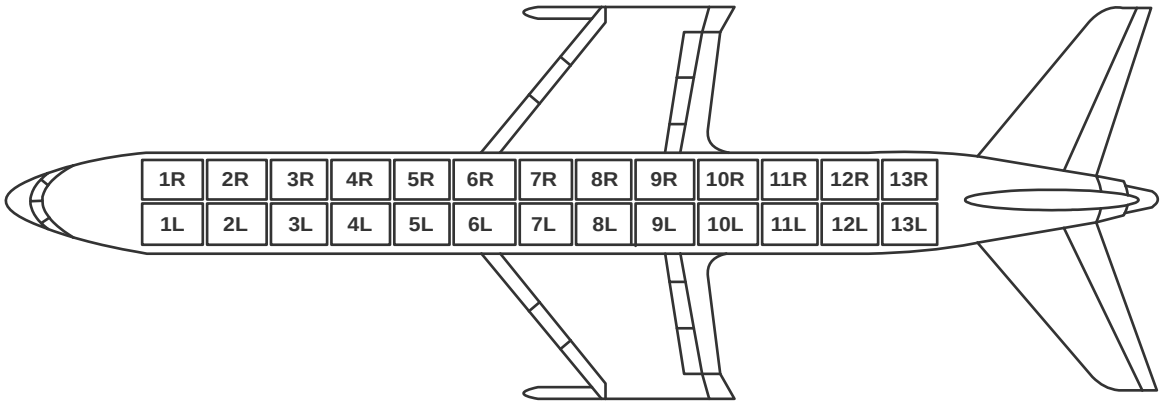

Configuration C

Pallet Position		Max Gross Weight Per Pallet *	CG ARM Fls. Sta.
1L	1R	3200	415.5
2L	2R	6500	524.5
3L	3R	6300	651.5
4L	4R	6400	760.5
5L	5R	6500	869.5
6L	6R	6500	978.5
7L	7R	6500	1087.5
8L	8R	6500	1196.5
9L	9R	6500	1305.5
10L	10R	6500	1414.5
11L	11R	6500	1523.5
12L	12R	6500	1632.5
13L	13R	6450	1741.5

L-1011 -200 ONLY

** The Gross weight includes the tare weight of the pallets and nets.*

Figure 8.4. Lockheed L-1011-200F (Maximum Individual Pallet Loads)

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Aircraft Type	Maximum ACL (s/t)	Pallets	Range with Maximum ACL (nautical mi)	Maximum ACL (s/t) per Leg Length (nautical mile)				Ferry Range No Cargo (nautical mile)
				2,000	2,500	3,000	3,500	
A300-600F	56.6	15	1,800	54	52.5	46	40	4,450
B-757-200F	43	13	3,600	43	43	43	43	4,850
B-767-300F	65.9	26	3,500	65.9	65	65.9	65.9	7,150
DC-8-55F	43.8	13	2,400	43.8	42.5	37	31.5	4,700
DC-8-62F	44	14	3,500	44	44	44	44	5,600
DC-8-62 Combi	36	10	3,450	36	36	36	35.5	5,700
DC-8-63F	55	18	2,250	55	52.3	47.5	42.8	4,600
DC-8-71F	48.5	18	2,300	48.5	45	38.5	32.3	4,700
DC-8-73F	54.3	18	2,500	54.3	54.3	50.3	43.5	4,800
B-747-100F	106.5	33	3,200	106.5	106.3	106.5	99.8	6,800
B-747-200F	120	33	3,200	120	120	120	112	7,900
B-747-300F	116	33	3,100	116	116	116	113.5	7,900
B-747-400F	129.7	33	3,800	129.7	129.7	129.7	129.7	8,650
DC/MD-10-10F	69.3	30	2,000	69.3	61.25	54.6	46.7	4,200
DC-10-30CF	71.8	30	3,000	71.8	71.8	71.8	69.5	6,700
DC/MD-10-30F	83.1	30	3,600	83.1	83.1	83.1	83.1	6,700
MD-11CF	89	35	4,500	89	89	89	89	7,800
MD-11F	96	35	3,750	96	96	96	96	7,800
L-1011-220F	63	26	2,600	63	63	55.5	48.5	3,750

NOTE: Ferry Range is distance the aircraft can fly with no cargo.

Figure 8.5. CRAF Long-range International Cargo Planning Factors

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Aircraft Type	Maximum Seats (Troops)	Range with Maximum Troops (NM)	Maximum Troops per Leg Length (NM)				Ferry Range No Troops (NM)
			2,000	2,500	3,000	3,500	
A-300-600ER	138	3,200	138	138	138	120	4,260
B-757-200	127	2,300	127	120	103	85	4,400
B-757-200ER	131	3,175	131	131	131	116	4,700
B-757-300ER	166	2,700	166	166	150	126	4,400
DC-10-10	222	2,300	222	201	150	100	4,000
DC-10-30	235	3,900	235	235	235	235	5,800
DC-10-40	222	2,750	222	222	203	160	4,875
DC-10-40J	219	3,200	219	219	219	195	4,856
MD-11	233	5,000	233	233	233	233	6,800
MD-11ER	338	4,500	338	338	338	338	6,800
B-747-100	394	2,900	394	394	365	313	6,600
B-747-200	365	3,800	365	365	365	365	7,600
B-747-400	295	6,250	295	295	295	295	8,650
B-767-200	149	2,450	149	145	120	98	7,500
B-767-200ER	161	3,650	161	161	161	161	7,700
B-767-300	186	3,375	186	186	186	167	6,800
B-767-300ER	213	3,500	213	213	213	213	7,200
B-767-400ER	232	3,500	232	232	232	232	6,500
B-777-200	250	4,200	250	250	250	250	9,200
B-777-200ER	263	5,515	263	263	263	263	9,500
L-1011-50	225	2,300	225	215	183	140	4,000
L-1011-100/150	230	2,900	230	230	220	174	4,400
L-1011-500	223	4,100	223	223	223	223	6,000

Note: Troop weights are calculated at 400 pounds each, which includes personal equipment and field gear for combat operations.

Figure 8.6. CRAF Long-range International Passenger Planning Factors

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			LOADERS				ELEVATORS				FORKLIFTS					STAIRS	
			60k	40k	25k	*NGSL*	316 A	316 E	CL-3	TA-40b	15K	10KA/T	10K STD	6K	4K	C-5	Wide Body
	Min-Max Height		39"-222"	41"-156"	38"-156"	39"-225"	19"-217"	19"-217"	19"-222"	20"-216"	TO-210"	TO-80"	TO-150"	TO-150"	TO-120"	184"312"	100"200"
B747	186"-204"	Main Deck Front/Side Door	Yes	No[6]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	108"-132"	Lower Lobes	Yes	Yes[1]	Yes[1]	Yes	No	No	No	Yes	Yes	No	Yes	Yes	M[4]	----	----
DC10	186"-204"	Main Deck Side Door	Yes	No[6]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	103"-119"	Lower Lobes	Yes	Yes[1]	Yes[1]	Yes	No	No	No	Yes	Yes	No	Yes	Yes	M[4]	----	----
DC8	126"-135"	Main Deck Side Door	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes
	68"-100"	Lower Lobes	N/A[2]	N/A[2]	N/A[2]	Yes	No	No	No	N/A	Yes	M[4]	Yes	Yes	Yes	----	----
MD11	186"-204"	Main Deck Side Door	Yes	Yes[1]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	103"-119"	Lower Lobes	Yes	Yes[1]	Yes[1]	Yes	No	No	No	Yes	Yes	No	Yes	Yes	M[4]	----	----
L1011	182"-186"	Passenger Doors	Yes	Yes[1]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	105"-112"	Lower Lobes	Yes	Yes[1]	Yes	Yes	No	No	No	Yes[3]	Yes	No	Yes	Yes	M[4]	----	----
B767	160"-176"	Passenger Doors	Yes	Yes[1]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	89"-102"	Lower Lobes	Yes	Yes[1]	Yes	Yes	No	No	No	Yes[8]	Yes	No	Yes	Yes	Yes	----	----
B777	208"-218"	Passenger Doors	Yes	Yes[6]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	127"-134"	Lower Lobes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	Yes	----	----
B757		Passenger Doors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No		Yes	Yes
	149"-158"	Lower Lobes	No[2]	Yes	Yes	Yes	No	No	No	N/A	Yes	No	Yes	Yes	Yes	----	----
A310	97"-105"	Passenger Doors				Yes										Yes	Yes
		Lower Lobes				Yes										----	----

Notes:

[1] K Loader must be backed up to lower lobe and may require safety rail removal to prevent contact with the aircraft fuselage. A 12-18 inch gap may exist between K loader and door.

[2] Narrow-body aircraft would not normally need K loaders/elevator for loading of lower compartments.

[3] Curvature of the aircraft does not permit loading of lower lobe of wide-body aircraft.

[4] M (Marginal) - Not normally recommended for use in loading due to maximum height limits.

[5] Should be used with rollerized pallet dolly.

[6] With height extender adapter, the 40 K loader can be used to load the main deck of wide-body aircraft.

[7] Using the extender adapter, 60 inches can be added to the height.

[8] Required lower lobe adapter attachment.

Figure 8.7. Material Handling Compatibility Chart

REFERENCES

A1.1. General. The following references provide guidance for personnel involved in movement of forces in airlift aircraft. It is not necessary to possess all the publications listed in this appendix. These references will provide further guidance for use in planning airlift movement. These references may not be current.

A1.2. Department of Defense (DOD) Publications.
DOD 4500.9-R Part III, Mobility, Defense Transportation Regulation (DTR)
DOD 4500.9-R Part II, Cargo Movement, Defense Transportation Regulation (DTR)

A1.3. Joint Service Publications:
AFMAN 24-204, TM 38-250, NAVSUPPUB 505, MCO P4030.19F, DLAM 4145.3 (Preparing Hazardous Materials for Military Air Shipments)

A1.4. Air Force Publications:
AFM 2-4, Tactical Air Force Operations—Tactical Airlift (will become AFDD 30)
AFM 11-1, USAF Glossary of Standardized Terms
AFI 10-402, Mobilization Planning
AFI 10-403, Deployment Planning
AFI 11-2C-130 V3 Addenda A, C-130 Operations Configuration Mission Planning
AFI 11-2KC-10 V3 Addenda A, KC-10 Aircraft Configuration
AFI 11-2C-17 V3 Addenda A, C-17 Configuration and Mission Planning
AFI 11-2C-5 V3 Addenda A, C-5 Operations Configurations and Mission Planning
AFI 11-2KC-135 V3 Addenda A, C/KC-135 Aircraft Configurations
AMCPAM 24-2 Vol 1, Civil Reserve Air Fleet Load Planning Guide
T.O. 1C-130A-9, Cargo Loading Manual
T.O. 1C-5A-9, Loading Instructions
T.O. 1C-17A-9, Loading Instructions
T.O. 1C-10(K)A-9, Cargo Loading Manual
T.O. 1C-135(K)A-9, Cargo Loading Manual
T.O. 1C-130J-9, Cargo Loading Manual
T.O. 1C-5A-9-2, Supplemental Loading Instructions

ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Definition
AACG	Arrival Airfield Control Group
ACC	Air Combat Command
ACL	Allowable Cabin Load
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AFM	Air Force Manual
AFR	Air Force Regulation
AMC CC	Commander, Air Mobility Command
AMC	Air Mobility Command
AMCU	Air Mobility Control Unit
AMLO	Air Mobility Liaison Officer
APOD	Aerial Port of Debarkation
APOE	Aerial Port of Embarkation
AR	Army Regulation
ATOC	Air Terminal Operations Center
CB	Center of Balance
C/B	Center of Balance
CONUS	Continental United States
CRAF	Civil Reserve Air Fleet
CRE	Contingency Response Element
CRG	Contingency Response Group
CRT	Contingency Response Team
CRW	Contingency Response Wing
CSE	Contingency Support Element
DACG	Departure Airfield Control Group
DOD	Department of Defense
D1	Distance One
D2	Distance Two
D3, D4, D5 (etc.)	Distance Three, Distance Four, Distance Five (etc.)
FM	Field Manual
FMFM	Fleet Marine Force Manual
FS	Fuselage Station
FRN	Force Requirement Number
GSS	Global Support Squadron
GW	Gross Weight
JA/ATT	Joint Airborne/Air Transportability Training
JCS	Joint Chiefs of Staff
K	1000 Pounds
MCC	Mobility Control Center
MCO	Marine Corps Order
MHE	Materials Handling Equipment
MOM	Moment

ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Definition
MTMC	Military Traffic Management Command
NAVSUP PUB	Naval Supplement Publication
NCO	Noncommissioned Officer
OPNAV INST	Operational Naval Instruction
OPNAV SUP	Operational Naval Supplement
OPORD	Operations Order
PLF	Pounds per Linear Foot
POP	Performance Oriented Packaging
PSI	Pounds Per Square Inch
REQID	Requirement Identification Number
RDL	Reference Datum Line
REV	Revised
RL	Reference Line
SAAM	Special Assignment Airlift Mission
TCN	Transportation Control Number
TCU	Transportation Control Unit
TM	Technical Manual
TMO	Traffic Management Office
TPFDD	Time Phase Force Deployment Data
ULN	Unit Line Number
UMO	Unit Movement Officer
USTRANSCOM CC	Commander, United States Transportation Command
W1	Weight One
W2	Weight Two
W3, W4, W5	Weight Three, Weight Four, Weight Five
ZFW CG	Zero Fuel Weight Center of Gravity

GLOSSARY

463L Pallet—An 88” x 108” aluminum flat base used to facilitate the upload and download of aircraft.

463L System—Aircraft pallets, nets, tie down and coupling devices, facilities, handling equipment, procedures, and other components designed to interface with military and civilian aircraft cargo restraint systems which accepts pallets 88” x 108”. Though designed for airlift, system components may have to move intermodally via surface modes to support geographic Combatant Commander objectives.

Accompanied Baggage—Baggage that accompanies the member/employee while traveling.

Aerial Port—An airfield that has been designated for the sustained air movement of personnel and materiel as well as an authorized port of entrance into or departure from the country where located.

Aerial Port of Debarkation (APOD)—A station that serves as an authorized port to process and clear aircraft and traffic for entrance to the country where located.

Aerial Port of Embarkation (APOE)—A station that serves as an authorized port to process and clear aircraft and traffic for departure from the country where located.

Air Mobility Control Unit (AMCU)—Generic term referring to ALCF, ALCS, AMCF, CRG, CRW, GMRS, GMS, GSS, USAFE/PACAF AMS, and USAFE/PACAF CRG.

Air Mobility Liaison Officer (AMLO)—An Air Force Officer primarily assigned to Army/Marine units with high priority, short notice airborne and air mobility missions. They work with the supported commander's G-3/G-4 staff to provide advice and assistance on air mobility matters. They provide key recommendations to both the Army commander and AMC command and control agencies. They also assist in requesting tactical airlift, survey and tactical drop zones, and control certain airdrop operations.

Aircraft Commander—A qualified pilot graduate of an aircraft commander upgrade course or aircraft commander initial qualification training, certified by the squadron commander to act as pilot in command of an aircraft.

Airlift Operations— Airlift operations involves the air transport and delivery of personnel, equipment, and supplies into an objective area. Airdrop or aircraft landing(s) may accomplish the delivery.

Alert Holding Area (AHA)—The vehicle, equipment, supply, and personnel control area. The AHA is under the control of the Arrival/Departure Airfield Control Group (A/DACG). It should be located near the departure airfield. It is used to assemble, inspect, hold, and service aircraft loads.

Allowable Cabin Load (ACL)—The maximum payload which can be carried on an in-

GLOSSARY

dividual sortie.

Block Time—Time determined by the scheduling agency responsible for mission accomplishment for the aircraft to arrive at (block in) or depart from (block out) a given airfield.

Bogie Axle – Two or more wheel sets that share a single suspension and/or pivot point.

Boom Operator—An aircrew member responsible for overall supervision of the on-load/offload operation of their assigned aircraft.

Border Clearance—Those clearances and inspections required to comply with federal, state, and local agricultural, customs, immigration, and immunizations requirements.

Bulk Cargo—Cargo with dimensions that will fit on a 463L pallet (104"Lx84"Wx96"H) .

Call Forward Area—Area where the Joint Inspection (JI) is conducted, a final briefing is provided to the deploying troops, and manifests are reviewed for accuracy.

Cargo—Supplies, materials, stores, baggage, or equipment transported by land, water, or air.

Center of Balance (CB)—The center of mass, or balance point, of an object. Also known as center of gravity (CG).

Chalk—Designated troops, equipment, or cargo which constitute a complete aircraft load.

Chalk Number—Number given to a complete load and to the transporting carrier.

Channel Airlift—Common-user airlift service provided on a scheduled basis between two points. There are two types of channel airlift. A requirements channel serves two or more points on a scheduled basis depending upon the volume of traffic; a frequency channel is time-based and serves two or more points at regular intervals.

Civil Reserve Air Fleet (CRAF)—A program in which the Department of Defense contracts for the services of specific aircraft, owned by a United States entity or citizen, during national emergencies and defense-oriented situations when expanded civil augmentation of military airlift activity is required. These aircraft are allocated, in accordance with Department of Defense requirements, to segments, according to their capabilities, such as international long-range and short-range cargo and passenger sections, national (domestic and Alaskan sections) and aeromedical evacuation and other segments as may be mutually agreed upon by the Department of Defense and the Department of Transportation.

Contingency Response Group (CRG)—Contingency Response Groups (CRGs) are designed to be first responders for opening airbases. These units will bridge the gap

GLOSSARY

between the seizure forces and the follow-on combat/expeditionary combat support forces. CRGs are critical to the AF's ability to rapidly deploy U.S. military forces and initiate air operations of any type in minimal time at any base or location around the globe. CRGs may also provide C2, aerial port services, quick turn maintenance, force protection and various airbase support capabilities for AMC's Global Mobility mission.

Contingency Response Element (CRE)—A provisional, deployed AMC organization established at fixed, en route, and deployed locations where AMC operational support is non-existent or insufficient. A CRE provides continuing on-site management of AMC airfield operations including C2, communications, aerial port, maintenance, security, services, weather, finance, contracting and intelligence--the critical elements needed to ensure a safe and highly efficient air base for all tanker and airlift operations.

Contingency Response Team (CRT)—Performs the same functions as a CRE, but on a smaller scale. CRTs are normally led by an enlisted 7-level member certified as a CRT chief.

Contingency Response Wing (CRW)—The Air Forces global reach crisis response force. Rapidly deploy tailor able, multi-role, multi-skilled, expeditionary mobility teams, organized to quickly assess and effectively open forward contingency airbases and conduct air mobility support operations anywhere in the world. Exercise command authority over the respective Contingency Response Groups (CRGs), Global Support Squadrons (GSSs) and Air Mobility Liaison Officers (AMLOs) at their Operating Locations (OLs) for organization, control of resources and equipment, personnel management, logistics, training, readiness, mobilization, demobilization, discipline, and any other appropriate matters. Ensures mission-ready airfield assessment teams, airfield operations, command and control (C2), aerial port, quick-turn aircraft maintenance, weather, intelligence, air traffic control, security forces, finance, fuels, supply, and contracting personnel are available to project and sustain combat forces worldwide.

Contingency Support Element (CSE)—CSEs provide a specific mission support capability other than the core command and control, logistics, or aerial port services. They may be deployed as an element of a CRE or CRT, or as a small scale stand alone entity.

Escort(s) or Courier(s), Transportation— United States Government military members or civilian employees, or Department of Defense contractor employees responsible for continuous surveillance and control of classified material during movements. Individuals designated as escorts or couriers must possess a Department of Defense - issued security clearance at least equal to the level of classification of the material being transported.

Dunnage—A piece of wood or plastic that is approximately 4 X 4 inches. Used to separate cargo from the base pallet.

Frustrated Cargo—cargo that failed the inspection at the in-check area, joint inspec-

tion, or any place after arriving at the cargo deployment function prior to loading the aircraft and was set aside until it could be fixed by the unit.

Global Support Squadron (GSS)—An active duty unit composed of a cadre of AMC airlift command and control experts. They provide the core experience and leadership for a CRE. This designation applies to the 573 GSS – Travis AFB, CA. and the 819 GSS – Joint Base McGuire-Dix-Lakehurst, NJ. When deployed, they perform the functions of a CRE.

Gross Weight—The combined weight of a container and its contents including packing material.

Ground Time—The combined weight of a container and its contents including packing material.

Hazardous Materials—A substance or material that has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and that has been so designated. The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous under the provisions of 49 Code of Federal Regulations (CFR), Parts 172.101 and 172.102, and materials that meet the defining criteria for hazard class and divisions in 49 CFR, Part 173.

Inter-Theater Airlift—The common-user airlift linking theaters to the continental United States and to other theaters as well as the airlift within the continental United States. The majority of these air mobility assets are assigned to the Commander, United States Transportation Command.

Intra-Theater Airlift—Airlift conducted within a theater with assets normally assigned to a geographic combatant commander or attached to a subordinate joint force component commander.

Joint Airborne/Air Transportability Training (JA/ATT)—Airlift conducted within a theater with assets normally assigned to a geographic combatant commander or attached to a subordinate joint force component commander.

Load Plan—A document specifying in detail the payload expressed in terms of passenger and freight carried on one aircraft for a specific destination.

Loading Time—A specified time, established jointly by the airlift and deploying commanders concerned, when aircraft are available for loading and loading is to begin.

Loadmaster—An aircrew member responsible for overall supervision of the onload/offload operation of their assigned aircraft.

Load Team—A team of individuals selected from members of the deploying unit, DAC-

GLOSSARY

G/AACG and CRE to provide aircraft loading/offloading support.

Load Team Chief—The senior Air Force individual (usually a CRE representative) assigned to the load team.

Manifest—A document specifying in detail the payload expressed in terms of passengers or freight carried in one aircraft for a specific destination.

Marshalling—Marshalling is the process by which units participating in an amphibious or airborne operation group together or assemble when feasible or move to temporary camps in the vicinity of embarkation points, complete preparations for combat, or prepare for loading and/or the process of assembling, holding, and organizing supplies and/or equipment, especially vehicles of transportation, for onward movement.

Marshalling Area—A location in the vicinity of a reception terminal or pre-positioned equipment storage site where arriving unit personnel, equipment, materiel, and accompanying supplies are reassembled, returned to the control of the unit commander, and prepared for onward movement. The joint complex commander designating the location will coordinate the use of the facilities with other allied commands and the host nation, and will provide life support to the units while in the marshalling area.

Materials Handling Equipment (MHE)—Mechanical devices for handling of supplies with greater ease and economy.

Outsize Cargo—Cargo that exceeds the dimensions of oversized cargo and requires the use of a C-5 or C-17 aircraft or surface transportation. A single item that exceeds 1,000 inches long by 117 inches wide by 105 inches high in any one dimension.

Oversize Cargo—Air cargo exceeding the usable dimension of a 463L pallet loaded to the design height of 96 inches, but equal to or less than 1,000 inches in length, 117 inches in width, and 105 inches in height. This cargo is air transportable on the C-5, C-17, C- 130, KC-10 and most civilian contract cargo carriers.

Ready Line—Where vehicles, equipment, supplies, and personnel are received from the call forward area and loaded aboard the aircraft. It is under the control of the mobility force and must be treated as a sterile area. Any changes made at this point will require a new Joint Inspection be accomplished.

Shoring—Plywood, board, or planking on the cargo floor to spread the load over a larger area, or to prevent damage.

Single Manager—A military department or agency designated by the Secretary of Defense to be responsible for management of specified commodities or common-Service activities on a Department of Defense-wide basis.

Special Assignment Airlift Mission (SAAM)—A mission performing special assign-

GLOSSARY

ment airlift. Special assignment airlift missions are defined as airlift requirements for special pickup or delivery by Air Mobility Command at points other than established Air Mobility Command routes, and which require special consideration because of the number of passengers involved, the weight or size of the cargo, the urgency or sensitivity of movement, or other special factors.

Strategic Airlift—The common-user airlift linking theaters to the Continental United States and to other theaters as well as the airlift within the Continental United States. These airlift assets are assigned to the Commander, United States Transportation Command. Due to the intertheater ranges usually involved, strategic airlift is normally comprised of the heavy, longer range, intercontinental airlift assets, but may be augmented with shorter-range aircraft.

Tactical Airlift—Airlift which provides the immediate and responsive air movement and delivery of combat troops and supplies directly into objective areas through airland, extraction, airdrop, and other air delivery techniques; and the air logistics support of all theater forces, including those engaged in combat operations, to meet specific theater objectives and requirements.

Traffic Management Office (TMO)—Uses military and commercial transportation to move personnel, eligible dependents, materiel, and property. Packages, classifies, and arranges personal property and cargo for shipment or storage.

Troop Commander—The troop CDR is usually the senior military member of the deploying chalk and will be assigned by the Service deployment authority at the point of origin or at the APOE to perform those duties. Though the troop CDR holds no legal authority as a CDR, they are responsible to act as the primary responsible authority for the chalk.

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Traffic Management Office (TMO)—Uses military and commercial transportation to move personnel, eligible dependents, materiel, and property. Packages, classifies, and arranges personal property and cargo for shipment or storage.

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Zero Fuel Weight—Weight, expressed in pounds, of a loaded aircraft not including wing and body tank fuel.

Zero Fuel Weight Center of Gravity (ZFW CG)—The location at which a loaded aircraft is balanced (excluding fuel) normally expressed in % of MAC. It includes the weight of the aircraft with all equipment, crew, passengers, and cargo, but does not include usable fuel.

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STUDENT REQUEST FOR ASSISTANCE

1. NAME AND RANK:

UNIT OF ASSIGNMENT:

POST OR BASE:

TELEPHONE NUMBER, DSN:

2. CONTROL NUMBER AND PLACE OF ACLP TRAINING CLASS:

3. EXPLAIN IN AS MUCH DETAIL AS POSSIBLE THE TYPE OF ASSISTANCE YOU ARE REQUESTING. USE ADDITIONAL SHEETS AS NECESSARY.

4. MAIL TO YOUR AFFILIATED AMCU.

STUDENT REQUEST FOR ASSISTANCE

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