AIRDROP OF SUPPLIES AND EQUIPMENT:
RIGGING AIRDROP PLATFORMS

JUNE 2006

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AIRDROP OF SUPPLIES AND EQUIPMENT: RIGGING AIRDROP PLATFORMS

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  - Types
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  - Restraining One Parachute
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  - Components
  - Operation

- Section II-Rigging Information
  - Extraction Force Transfer Coupling
SCOPE

The purpose of this manual is to provide the latest approved procedures for rigging airdrop Platforms. This manual is written for use by the parachute rigger. It consists of 10 chapters.

The procedures contained in this manual are typical and serve as the standard from which all platform rigging is derived. Due to the uniqueness of some equipment and items, the procedures in a specific rigging manual may be different from those in this manual. When procedures are different, those in the specific manual will be followed. When an item of equipment is specified to be used for which its minimum or maximum capacity is exceeded, a notice of exception will be printed at the beginning of each paragraph in each rigging manual where the exception is authorized. When an item of airdrop equipment is replaced or a procedure is changed, it will be impossible to change all manuals in the field at one time. Therefore, this manual will be changed, when necessary.

Chapters 1 through 10 contain specific limitations and general information about the rigging of airdrop platform loads for low-velocity airdrop from US aircraft and also shows and tells how to prepare, attach, and safety tie some of the components and systems used in the specific rigging manuals of the FM 4-20.100/TO 13C7 series.

Note: New information concerning the Extraction Parachute Jettison System (EPJS) has been added along with some new procedures for the extraction force transfer coupling (EFTC). The C-141 and C-5 aircraft have been taken out and the C-17 aircraft information has been added. Also, a new user friendly format has been introduced combining general information and rigging information in each chapter.

USER INFORMATION

The proponent of this publication is United States Army Training and Doctrine Command (TRADOC). You are encouraged to report any errors or omissions and to suggest ways of making this a better manual.

This publication applies to Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR) unless otherwise stated.

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Chapter 1

Airdrop Information

RESPONSIBILITIES

1-1. Personnel responsible for loading rigged platform loads into aircraft and installing and operating airdrop systems are given below.

- **Air Forces Aircraft.** Air forces personnel are responsible for loading the rigged platform loads into the aircraft and for installing and operating the airdrop system.
- **US Air Force (USAF) Aircraft Foreign Joint Training.** USAF aircraft and crews conducting joint airdrop operations with foreign military governments are not authorized to airdrop equipment and configurations not included in this manual, unless authorized by specific MAJCOM.
- **Other Aircraft.** When an aircraft other than US Air Force aircraft is used, the service being airdropped may be responsible for loading their rigged platform loads into the aircraft and for installing and operating the airdrop systems.

SAFETY PRECAUTIONS

1-2. Safety precautions MUST be closely followed when airdrop platform loads are rigged. Failure to follow the precautions could result in serious injury to the rigger or damage to the drop item or aircraft. The following safety precautions shall be taken by the rigger:

- Make sure that when lifting heavy items, the lifting device has a rated lifting capacity that exceeds the weight of the item to be lifted.
- Be sure that items being lifted are secured to the lifting device.
- Avoid working under suspended equipment unless absolutely necessary.
- Cover all wet cell batteries in service with plastic or nonflammable material.
- Check fuel tanks to ensure that they do not exceed the fuel level of the specific rigging manuals. Check fuel cans to make sure they are performance-oriented packaging approved. When stowing fuel cans, use cellulose wadding or other suitable material to prevent metal-to-metal contact.
- Package, mark, and label hazardous materials according to AFMAN 24-204(I)/TM 38-250.

CAUTION

Only ammunition listed in FM 4-20.153/MCRP 4-11.3B/TO 13C7-18-41 may be airdropped. Hazardous material must be packaged, marked, and labeled as required by AFMAN(I) 24-204/TM 38-250.
TYPE AND METHOD OF AIRDROP

1-3. As used in this manual, airdrop is the air-to-ground delivery of platform loads from an aircraft in flight. Airdrop is designed to supplement the usual surface methods of delivering supplies and equipment to forces in the field.

- **Type of Airdrop.** Currently the only type of airdrop used to deliver platform loads is low-velocity airdrop. Low-velocity airdrop delivers platform loads from an aircraft at various altitudes. Cargo parachutes are used to slow the descent of the loads to ensure minimum landing shock. The type and number of cargo parachutes can vary as shown in Table 1-1. Due to differing deployment characteristics, parachutes of different types will not be mixed on the same load. Loads with different type parachutes and loads with quantities of the same type parachute may be airdropped from the same aircraft or element provided the following conditions are met:
  - Airdrop altitude for the aircraft or element will be determined by the type and number of parachutes on the load requiring the highest airdrop altitude.
  - Aircraft or elements with lower airdrop altitudes will drop before aircraft or elements with higher airdrop altitudes.
  - The transported force accepts strike report responsibility for loads other than the first platform to exit the aircraft or element lead for formation airdrops.

<table>
<thead>
<tr>
<th>MINIMUM DROP ALTITUDE (FEET ABOVE GROUND LEVEL)</th>
<th>PARACHUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>G-11B</td>
</tr>
<tr>
<td>750</td>
<td>1</td>
</tr>
<tr>
<td>1,150</td>
<td>5</td>
</tr>
<tr>
<td>1,200</td>
<td>6 to 7</td>
</tr>
<tr>
<td>1,300</td>
<td>8</td>
</tr>
<tr>
<td>550</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(Not for Army Platform Loads)</td>
</tr>
</tbody>
</table>

**CAUTION**
Drop altitudes reflect Minimum drop altitudes.

- **Method of Airdrop.** The extraction method is used for platform loads delivered by low-velocity airdrop on type V platform. This method uses a cargo extraction parachute to pull the platform load from the cargo compartment of the aircraft.
COMMONLY USED ITEMS

1-4. Items commonly used for rigging platform loads are described in this section. Each rigging manual in the FM 4-20.100/TO 13C7 series contains one or more tables of equipment required. These tables list the National Stock Number (NSN), item, and quantity of each item needed to prepare and rig the load covered in the manual. Standard airdrop hardware items are shown in Figure 1-1. Standard airdrop straps and canvas items are shown in Figure 1-2. Some textile, wood, and miscellaneous items are described below.

- **Textile Items.** The most common textile items and their uses are as follows:
  - Type III nylon cord is used to make safety ties and to hold items in place. It has a tensile strength of 550 pounds.
  - 1/2-inch tubular nylon webbing is used to secure items during airdrop and to tie the deadman’s safety tie. It has a tensile strength of 1,000 pounds.
  - Type I, 1/4-inch cotton webbing is used to make many of the needed safety ties used when a platform load is rigged. It has a tensile strength of 80 pounds.
  - 5/8-inch or 9/16-inch tubular nylon webbing may be used for the deadman’s safety tie and parachute clustering ties in place of 1/2-inch tubular nylon webbing. Five-eighths inch tubular nylon webbing has a tensile strength of 2,250 pounds and 9/16-inch tubular nylon webbing has a tensile strength of 1,500 pounds.
• Wood Items. Wood items used when platform loads are rigged for specific airdrop are made locally. Details for building these wood items are in the specific rigging manuals.

_Note._ Plywood will be grade AC or AD.

• **Miscellaneous Items.** Miscellaneous items that may be used when a platform load is rigged are discussed below. The proper use of these items will be covered in detail in this manual or in other FM 4-20.100/TO13C7 series manuals.
  - Adhesive tape (masking tape), 2 inches wide, is used to secure folds of excess webbing. It is also used to protect honeycomb from being cut by type III nylon cord and to hold padding in place. It can be used for other tasks also.
  - Type IV, cloth-backed adhesive tape, 2 inches wide, is used to protect honeycomb from being cut by type III nylon cord and to hold padding in place. It can be used for other tasks, such as securing the sling keepers.

  **CAUTION**
  The type IV, cloth-backed adhesive tape, will not be used to secure folds of extraction lines, suspension slings, and deployment lines.

  - Cellulose wadding and felt sheets have many uses. They may be used to pad fragile items, to prevent sharp edges from cutting, and to protect slings during airdrop.
  - Pad energy dissipating (honeycomb) are used to absorb the landing shock. Honeycomb is also used to level, pad, and fill empty spaces.

**INSPECTION AND DESCRIPTION OF ITEMS**

1-5. Canvas, metal, webbing, and wood items are inspected according to TM 10-1670-296-20&P/TO 13C7-49-2.

  **CAUTION**
  The maximum rated strength will reduce depending on the configuration in which it is used.
1 The large clevis is used in forming suspension systems, grouping bridle, and attaching riser extensions to the G-11 cargo parachute. It may be used on the type V platform for suspension. The clevis is used in other places, as indicated in the specific rigging manual. This has a maximum rated strength of 40,000 pounds.

2 The medium clevis is used to attach riser extensions to the G-12E cargo parachute and emergency aft restraint provisions on the type V platform. Other uses are given in the specific rigging manual. This has a maximum rated strength of 20,000 pounds.

3 The screw-pin clevis is used with a sleeve in a manner similar to a large suspension clevis. This has a maximum rated strength of 40,000 pounds.

4 The 10,000-pound load binder is used to hook two D-rings together or to hook a D-ring to a platform tiedown clevis on the airdrop platform. This has a maximum rated strength of 10,000 pounds.

5 The heavy-duty D-ring is used with a 15-foot tiedown strap. This has a maximum rated strength of 10,000 pounds.

6 The four-point link assembly is used to cluster two 28-foot cargo extraction parachutes on a low-velocity load. This has a maximum rated strength of 56,000 pounds.

7 The platform clevis is attached to the side rails, tandem links, or suspension links of the type V platform in order to secure the load. This has a maximum rated strength of 10,000 pounds.

Figure 1-1. Hardware Items Used for Rigging Platform Loads
8 The 5 1/2-inch, two-point link assembly is used to join suspension slings and extraction lines and to attach an extraction line to a cargo extraction parachute. This has a maximum rated strength of 30,000 pounds.

9 The attitude control bar (ACB) is used as an alternate spreader bar on loads identified in specific rigging manuals.

10 The 3 3/4-inch, two-point link assembly is used to join suspension slings and to attach an extraction line to a cargo extraction parachute. This has a maximum rated strength of 30,000 pounds.

Figure 1-1. Hardware Items Used for Rigging Platform Loads (Continued)
11 The guillotine-type knife is used on parachute release straps and in other places as directed in the specific rigging manual.

12 The tandem link assembly is used on the type V platform for low-velocity airdrop for platform suspension and emergency aft restraint.

13 The suspension bracket assembly is used for platform suspension.

14 The three-point link may be used to connect suspension slings and is part of the extraction force transfer coupling.

15 The 8-spool load coupler may be utilized with the automatic cargo parachute release.

Figure 1-1. Hardware Items Used for Rigging Platform Loads (Continued)
1. The single-knife parachute release strap, with guillotine knife, is used to cut one parachute restraint strap on a low-velocity airdrop load.

2. The multi-knife parachute release strap is used to cut one to three parachute restraint straps on a platform load rigged for low-velocity airdrop. The strap comes with three guillotine-type release knives. Knives that are not being used are removed. This release strap is always used in pairs. The multi-knife release strap is used in all cases where multiple knives are required.

Figure 1-2. Straps and Canvas Items Used for Rigging Platform Loads
3 The 15-foot Dacron tiedown strap is used to lash an airdrop load to the platform. Other uses of this strap are covered in the specific rigging manual. This has a maximum rated strength of 10,000 pounds.

4 The large clevis cover is used on the large and medium suspension clevis when the clevis is used to join the risers of a cargo parachute to a riser extension.

Figure 1-2. Straps and Canvas Items Used for Rigging Platform Loads (Continued)
MAXIMUM RIGGED WEIGHT

1-6. The weight cited in the rigged load data for each specific load is typical for the load as shown. Some amount of overweight is allowed as long as load dimensions, rigging and extraction components, and rigging procedures are not changed.

Note. When a maximum allowable rigged weight is specified in the rigged load data, this weight is the absolute maximum and will not be exceeded.

ACCOMPANYING LOADS

1-7. Accompanying loads are items of supplies and equipment that may be added to a certain primary load as specified in the specific rigging manual for that load. Each airdrop manual states whether an accompanying load is authorized and lists the restrictions for that particular load. The following restrictions apply to all accompanying loads.

- The accompanying load must be positioned so that—
  - The primary load will not hit or crush it upon ground impact.
  - It will not interfere with the suspension slings.
- The accompanying load must not cause the—
  - Height of the rigged load to exceed the height limitations and the tip-off curve (Table 1-2 and Table 1-3) of the aircraft used.
  - Weight of the rigged load to exceed the maximum allowable weight prescribed in the specific rigging manual.
  - Center of balance (CB) of the rigged load to move outside the limitations shown in Figure 1-3.
  - Hang angle of the suspended rigged load to exceed 1 inch per linear foot of platform length.

CAUTION

The accompanying load must be lashed to meet the same restraint requirements as the primary load.

STOWING ACCOMPANYING LOADS

1-8. Each specific rigging manual contains the weight limitations, placement, and any additional restrictions on accompanying loads.
**CAUTIONS**

1. Only ammunition listed in FM 4-20.153/MCRP 4-11.3B/TO 13C7-18-41 may be rigged for airdrop.

2. Hazardous materials must be packaged, marked, and labeled as required by AFMAN 24-204(I)/TM 38-250.

3. At least two layers of honeycomb must be placed under all ammunition rigged for airdrop unless the specific rigging manual states differently.

**PREPARING DROP ITEMS**

1-9. Some items need to be prepared for rigging. This preparation can include removing, reinforcing, stowing, and securing components. Detailed preparation instructions will be included in the specific rigging manual.

**COVERING LOAD**

1-10. Covers may be needed to protect the load and keep the suspension slings from fouling. To keep the load from being damaged by falling hardware such as parachute releases, it may be necessary to cover portions of the load with honeycomb, plywood, or cloth protectors. If a cover is needed, the specific rigging manual will include this information and the procedures for its installation.

**CENTER OF BALANCE (CB)**

1-11. The CB of an airdrop platform load, based on the total rigged weight, is given in the rigging manual for a particular item. If the load varies from the one given in a particular manual, the CB must be recomputed using the procedures shown in Figure 1-4.

**CAUTION**

If the CB or load profile exceeds the limits of Table 1-2 or Table 1-3 or Figure 1-4, the load is not acceptable.
### Table 1-2. C-130 Forward Profile Limits (Tip Off Curve) for Airdrop Platforms

<table>
<thead>
<tr>
<th>DISTANCE FORWARD OF CB (INCHES)</th>
<th>MAXIMUM HEIGHT (INCHES)</th>
<th>DISTANCE FORWARD OF CB (INCHES)</th>
<th>MAXIMUM HEIGHT (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 45</td>
<td>100</td>
<td>153 to 155</td>
<td>82</td>
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<td>99</td>
<td>156 to 160</td>
<td>81</td>
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<td>161 to 162</td>
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<td>88 to 93</td>
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<td>163 to 165</td>
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<td>94 to 100</td>
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<td>166 to 168</td>
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<td>169 to 170</td>
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<td>108 to 113</td>
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<td>171 to 172</td>
<td>76</td>
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<tr>
<td>114 to 117</td>
<td>93</td>
<td>173 to 174</td>
<td>75</td>
</tr>
<tr>
<td>118 to 122</td>
<td>92</td>
<td>175 to 177</td>
<td>74</td>
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<tr>
<td>123 to 124</td>
<td>91</td>
<td>178 to 179</td>
<td>73</td>
</tr>
<tr>
<td>125 to 128</td>
<td>90</td>
<td>180 to 181</td>
<td>72</td>
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<td>129 to 133</td>
<td>89</td>
<td>182 to 183</td>
<td>71</td>
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<td>70</td>
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<td>139 to 141</td>
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<td>187 to 188</td>
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<td>191 to 192</td>
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<td>147 to 150</td>
<td>84</td>
<td>193 to 195</td>
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<tr>
<td>151 to 152</td>
<td>83</td>
<td>196 to 197</td>
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</table>

### Table 1-3. C-17 Forward Profile Limits (Tip Off Curve) for Airdrop Platforms

<table>
<thead>
<tr>
<th>DISTANCE FORWARD OF CB (INCHES)</th>
<th>MAXIMUM HEIGHT (INCHES)</th>
<th>DISTANCE FORWARD OF CB (INCHES)</th>
<th>MAXIMUM HEIGHT (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 53</td>
<td>115</td>
<td>161 to 164</td>
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<td>54 to 74</td>
<td>114</td>
<td>165 to 170</td>
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<td>83 to 94</td>
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<td>175 to 178</td>
<td>95</td>
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<td>179 to 182</td>
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<td>183 to 187</td>
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<td>109 to 112</td>
<td>109</td>
<td>188 to 191</td>
<td>92</td>
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<tr>
<td>113 to 116</td>
<td>108</td>
<td>192 to 194</td>
<td>91</td>
</tr>
<tr>
<td>117 to 122</td>
<td>107</td>
<td>195 to 198</td>
<td>90</td>
</tr>
<tr>
<td>123 to 128</td>
<td>106</td>
<td>199 to 202</td>
<td>89</td>
</tr>
<tr>
<td>129 to 132</td>
<td>105</td>
<td>203 to 204</td>
<td>88</td>
</tr>
<tr>
<td>133 to 138</td>
<td>104</td>
<td>205 to 206</td>
<td>87</td>
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<td>139 to 142</td>
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<td>207 to 210</td>
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<td>143 to 148</td>
<td>102</td>
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<td>149 to 150</td>
<td>101</td>
<td>213 to 214</td>
<td>84</td>
</tr>
<tr>
<td>151 to 154</td>
<td>100</td>
<td>215 to 217</td>
<td>83</td>
</tr>
<tr>
<td>155 to 160</td>
<td>99</td>
<td>218 to 220</td>
<td>82</td>
</tr>
</tbody>
</table>
### Airdrop Information

**Notes.**

1. Distances are measured in inches from the front edge of the platform.
2. Shaded area indicates allowable CB tolerances.
3. These drawings are not drawn to scale.

#### Figure 1-3. CB Limits for Airdrop Platforms

<table>
<thead>
<tr>
<th>PLATFORM LENGTH (FEET)</th>
<th>MINIMUM A (INCHES)</th>
<th>MAXIMUM B (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>30</td>
<td>66</td>
</tr>
<tr>
<td>12</td>
<td>52</td>
<td>91 ½</td>
</tr>
<tr>
<td>16</td>
<td>75</td>
<td>117</td>
</tr>
<tr>
<td>20</td>
<td>97 ½</td>
<td>142 ½</td>
</tr>
<tr>
<td>24</td>
<td>120</td>
<td>168</td>
</tr>
<tr>
<td>28</td>
<td>120</td>
<td>190</td>
</tr>
<tr>
<td>32</td>
<td>157</td>
<td>212</td>
</tr>
</tbody>
</table>
ITEMS AND LOADS IN COLD CLIMATES

1-12. Some items to be dropped may have been modified for use in cold climates by the installation of extra equipment. Special rigging procedures may be needed when the drop item has been so modified. When loads are to be dropped in cold climates, all excess webbing of suspension slings and tie-down straps must be folded and tied with type I, 1/4-inch cotton webbing.
KNOTS

1-13. Some of the knots used for rigging platform loads are shown in Figure 1-5. When tying knots using nylon material, place an overhand knot in the running ends.

Figure 1-5. Knots Used During Rigging
5. Make an overhand knot in one end.
6. Follow the curve back in the reverse direction with the other end.

**Notes.**
1. There is no need to safety tie the ends when webbing is used.
2. Be sure the knot is neat, so as to tell if it is tied correctly.
3. This knot will jam after heavy loading.

**RING BEND KNOT USED ON THE DRIVE-OFF AID**

---

Figure 1-5. Knots Used During Rigging (Continued)
5. Make an overhand knot in one end.
6. Follow the curve back in the reverse direction with the other end.

**Notes.**
1. There is no need to safety tie the ends when webbing is used.
2. Be sure the knot is neat, so as to tell if it is tied correctly.
3. This knot will jam after heavy loading.

**RING BEND KNOT USED ON THE DRIVE-OFF AID**

---

**Figure 1-5. Knots Used During Rigging (Continued)**
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Chapter 2

The Type V Airdrop Platform

SECTION I-GENERAL INFORMATION

USE

2-1. The type V airdrop platform, as shown in Figure 2-1, serves as the base on which supplies and equipment are restrained. This platform also supports the load during the extraction, parachute deployment, suspension, and recovery phases. The type V airdrop platform is used for low-velocity airdrop. The type V platform can be assembled in 8-, 12-, 16-, 20-, 24-, 28-, and 32-foot lengths. The assembled platform is 108 inches wide. A detailed description of this platform is in TM 10-1670-268-20&P/TO 13C7-52-22. The nose bumper is not required, unless required by a specific rigging manual. The type V platform spreads the shock of ground impact. Limitations for the type V platform are listed in Table 2-1.

Figure 2-1. Type V Airdrop Platform
Table 2-1. Limitations for Type V Airdrop Platforms when Dropping from C-130 Series and C-17 Aircraft

C-130 Series Aircraft

<table>
<thead>
<tr>
<th>Length (Feet)</th>
<th>Width (Inches)</th>
<th>Width (Pounds)</th>
<th>Platform Surface (Square Feet)</th>
<th>Minimum Rigged Weight (Pounds)</th>
<th>Maximum Rigged Weight (Pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>108</td>
<td>820</td>
<td>72</td>
<td>2,520</td>
<td>15,000</td>
</tr>
<tr>
<td>12</td>
<td>108</td>
<td>1,220</td>
<td>108</td>
<td>3,780</td>
<td>21,000</td>
</tr>
<tr>
<td>16</td>
<td>108</td>
<td>1,590</td>
<td>144</td>
<td>5,040</td>
<td>28,000</td>
</tr>
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<td>20</td>
<td>108</td>
<td>1,950</td>
<td>180</td>
<td>6,300</td>
<td>39,000</td>
</tr>
<tr>
<td>24</td>
<td>108</td>
<td>2,280</td>
<td>216</td>
<td>7,560</td>
<td>42,000</td>
</tr>
<tr>
<td>28</td>
<td>108</td>
<td>2,820</td>
<td>252</td>
<td>8,820</td>
<td>42,000</td>
</tr>
<tr>
<td>32</td>
<td>108</td>
<td>3,056</td>
<td>288</td>
<td>10,080</td>
<td>42,000</td>
</tr>
</tbody>
</table>

C-17 Aircraft

<table>
<thead>
<tr>
<th>Length (Feet)</th>
<th>Width (Inches)</th>
<th>Width (Pounds)</th>
<th>Platform Surface (Square Feet)</th>
<th>Minimum Rigged Weight (Pounds)</th>
<th>Maximum Rigged Weight (Pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>108</td>
<td>820</td>
<td>72</td>
<td>2,520</td>
<td>10,000</td>
</tr>
<tr>
<td>12</td>
<td>108</td>
<td>1,220</td>
<td>108</td>
<td>3,780</td>
<td>18,500</td>
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<tr>
<td>16</td>
<td>108</td>
<td>1,590</td>
<td>144</td>
<td>5,040</td>
<td>28,000</td>
</tr>
<tr>
<td>20</td>
<td>108</td>
<td>1,950</td>
<td>180</td>
<td>6,300</td>
<td>39,000</td>
</tr>
<tr>
<td>24</td>
<td>108</td>
<td>2,280</td>
<td>216</td>
<td>7,560</td>
<td>42,000</td>
</tr>
<tr>
<td>28</td>
<td>108</td>
<td>2,820</td>
<td>252</td>
<td>8,820</td>
<td>42,000</td>
</tr>
<tr>
<td>32</td>
<td>108</td>
<td>3,056</td>
<td>288</td>
<td>10,080</td>
<td>42,000</td>
</tr>
</tbody>
</table>

PLATFORM LIMITATIONS FOR AIRCRAFT

2-2. Cargo and transport aircraft are specifically designed to deliver supplies and equipment by airdrop and are employed in airborne operations. Aircraft limitations are described below.

- **Hercules (C-130).** Platform loads are generally restricted to a height of 100 inches (measured from the bottom of the platform) and weight of 25,000 pounds for aircraft with an aircraft serial number of 62-1783 or lower. For aircraft with an aircraft serial number of 62-1784 and higher, and for aircraft with a serial number of 61-2358, the weight restriction is 42,000 pounds. MC-130E Combat Talon I and MC-130H Combat Talon II aircraft are restricted to 35,000 pounds. Single and combined platform lengths are restricted to 28 feet for MC-130E Combat Talon I aircraft and 41 feet of available floor space for all other C-130 aircraft. When the towplate is used for drogue extraction system (DES) airdrops, the extraction/drogue parachute requirements in Table 9-1 will apply. DES is the primary method of extraction for Combat Talon aircraft.

- **Globemaster (C-17).** Platform loads are generally restricted to a height of 118 inches measured from the bottom of the platform. Platform loads are generally restricted to a weight of 60,000 pounds. For multiple platforms, up to 110,000 pounds of airdrop load may be airdropped. Loads certified for low-velocity airdrop from C-130 aircraft that meets the limitations in Table 2-1 may be airdropped from the C-17 aircraft. The aircraft has a total available floor space of 64 feet.
SECTION II-PLATFORM AND HONEYCOMB PREPARATION

INSPECTING PLATFORM

2-3. Inspect or and inspect, the type V airdrop platform as outlined in TM 10-1670-268-20&P/TO 13C7-52-22.

SUSPENDING PLATFORM LOADS

2-4. The suspension points for a platform-suspended load on a type V platform are the suspension bracket assembly holes. The emergency aft restraint holes are provided in the tandem link only. The suspension bracket assembly as shown in Figure 2-2 may be positioned at various points along a platform rail.

**Note.** These drawings are not drawn to scale.

Figure 2-2. Tandem Link Assembly and Suspension Bracket Assembly
• However, their positioning is limited by the fact that the bolt hole configuration of the platform side rails only allows the suspension bracket assembly to be secured within the 2-foot panels of the platform. Every panel assembly has a four-bolt configuration on each side. These four bolts are designated as platform clevis points. The suspension bracket assembly can be positioned within the bolt configuration of a panel as shown in Figure 2-3. A reference hole “B” is used to show the appropriate position of the suspension bracket assembly as shown in Figures 2-2 and 2-3. The direction of the suspension bracket assembly is determined by matching reference hole “B” with the prescribed platform clevis number and placing the suspension bracket assembly in the direction where it can be secured within the same panel bolt configuration. Figure 2-4 shows the suspension bracket assemblies installed. Table 2-2 shows the maximum allowable suspended weights for the four-point and centerline suspension systems. Figure 2-5 details the centerline suspension system.

**Note.** These drawings are not drawn to scale

![Figure 2-3. Bolt Configuration of a Panel](image-url)
Note. These drawings are not drawn to scale.

1. Remove the tandem link on the front of the right platform rail.
2. Remove the required bushings, as given in the specific rigging manual, from the bushing holes in the right rail.
3. Insert a suspension bracket assembly on the front end of the right rail. Slide the bracket assembly along the rail until the holes in the bracket assembly align with the required rail holes. Bolt the bracket assembly in place with the bushing bolts. Reinstall the required bushings and bolts.
4. Remove the required bushings, as given in the rigging manual, from the bushing holes in the right rail.
5. Insert a suspension bracket assembly on the rear of the right rail. Slide the bracket assembly along the rail until the holes in the bracket assembly align with the required rail holes. Bolt the bracket assembly in place with the bushing holes. Reinstall the required bushings and bolts.
6. Install two suspension bracket assemblies on the left rail, adapting the procedures in steps 1 through 5 above.
7. Reinstall the tandem link assembly from step 1.

Figure 2-4. Suspension Bracket Assemblies Installed
Table 2-2. Maximum Allowable Suspended Weights for the Four-Point and Centerline Suspension Systems

**Four-Point Suspension System**

The following table lists the maximum allowable suspended weights along with the suspension bracket assembly and/or tandem link position. All links positioned along the most forward and aft panels will be tandem links. All other positions along the platform side rail will use the suspension bracket assembly.

<table>
<thead>
<tr>
<th>Platform Length (feet)</th>
<th>Suspension/Tandem Link Positions(platform clevis numbers)</th>
<th>Maximum Suspended Weight (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>3, 3A, 14, 14A</td>
<td>16,000</td>
</tr>
<tr>
<td>12</td>
<td>3, 3A, 22, 22A</td>
<td>14,000</td>
</tr>
<tr>
<td>16</td>
<td>3, 3A, 30, 30A</td>
<td>9,300</td>
</tr>
<tr>
<td>16</td>
<td>8, 8A, 25, 25A</td>
<td>26,000</td>
</tr>
<tr>
<td>20</td>
<td>8, 8A, 33, 33A</td>
<td>19,000</td>
</tr>
</tbody>
</table>

**Centerline Suspension System**

The centerline suspension system consists of eight suspension bracket assemblies, four of which form a bridge on each side of the platform in the center and six suspension slings. Figure 2-5 details the configuration. The following table lists the maximum suspended weights along with the position of the suspension bracket assemblies on the platform rails.

<table>
<thead>
<tr>
<th>Platform Length (feet)</th>
<th>Suspension/Tandem Link Positions(platform clevis numbers)</th>
<th>Maximum Suspended Weight (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>5, 5A, 36, 36A</td>
<td>16,000</td>
</tr>
<tr>
<td></td>
<td>17, 17A, 24, 24A</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>8, 8A, 41, 41A</td>
<td>14,000</td>
</tr>
<tr>
<td></td>
<td>20, 20A, 29, 29A</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>8, 8A, 49, 49A</td>
<td>9,300</td>
</tr>
<tr>
<td></td>
<td>24, 24A, 33, 33A</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>8, 8A, 57, 57A</td>
<td>26,000</td>
</tr>
<tr>
<td></td>
<td>28, 28A, 37, 37A</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* All maximum suspended weights can be higher with specific loads which increase the rigidity of the platform. Methods that differ from the suspension systems described above are given in the specific rigging manuals.
Note. This drawing is not drawn to scale.

Figure 2-5. Centerline Suspension System Shown
PREPARING THE TYPE V PLATFORM

2-5. The platform must be prepared by attaching clevises, tandem links or suspension bracket assemblies according to the specific rigging manual. Figure 2-6 gives an example of how to bolt the clevises to the bushings in the platform side rails and how to number them.

Step:

1. Bolt the tandem links and suspension bracket assemblies to the platform side rails, if needed.
2. Bolt the clevises to the bushings in the platform rails as shown in the specific rigging manual.
3. Bolt clevises (when needed) to the bushings in the tandem links and suspension bracket assemblies.
4. Starting at the front of the platform, number the clevises bolted to the right side beginning with 1 and those bolted to the left side beginning with 1A.
5. Starting at the front of the platform, number the two tiedown rings on each panel A and B from right to left. Label the four tiedown rings on the rear panel A, B, C, and D from right to left. Starting with the first panel, number the tiedown rings beginning with 1 from front to rear.

Notes:
1. The single clevis is sometimes installed in an inverted manner if the specific rigging manual calls for it.
2. One clevis is sometimes installed on another inverted clevis. This is called a double clevis. Do not number the inverted clevis.
3. Two clevises attached to an inverted clevis is called a triple clevis. The two clevises will be numbered as two separate clevises. Do not number the inverted clevis.
4. Do not attach a load binder to the inverted portion of the double or triple clevis.
BUILDING HONEYCOMB STACKS

2-6. Honeycomb stacks must be prepared according to the specific rigging manual. Honeycomb is used to absorb the landing shock. Figure 2-7 shows a typical honeycomb stack.

**Note.** When honeycomb layers are longer than 96 inches or wider than 36 inches, alternate the layers to build a solid, cohesive stack.

Figure 2-7. Typical Honeycomb Stack

1 Lumber
2 Plywood
3 Cutouts or notches
4 Layers of honeycomb

**Note.** Glue the layers of the stack together.
PLACING HONEYCOMB STACKS

2-7. Honeycomb stacks must be set on the platform according to instructions in the specific rigging manual. Figure 2-8 shows a typical placement of honeycomb stacks on a type V platform.

1 Place the honeycomb stacks on the platform according to instructions in the specific rigging manual.

Note. Do not glue the stacks to the platform.

2 Number the stacks from front to rear in a numerical sequence with 1 at the front of the platform.

Figure 2-8. Typical Placement of Honeycomb Stacks on Platform
DRIVE-OFF AID

2-8. The drive-off aid may be used with the HMMWV, 2 1/2-ton truck, and the 5-ton, 900-series truck. The drive-off aid, shown in Figure 2-9, consists of a fabric track sewn into a ladder-type configuration. The system is placed on two of the identified vehicle’s tires and attached to the type V platform tiedown rings with a tiedown clevis or type VIII nylon webbing. There are two tracks to each system. Each track is 30 feet long and 22 inches wide and weighs 21 pounds. When powered up, the vehicle (with tiedown assemblies removed), will progressively wrap the webbed ladder around the two tires (using the platform for leverage) and pull itself clear of the honeycomb and platform. Figure 2-10 shows the drive-off aid installed on the vehicle wheels.

REAR PLATFORM ATTACHMENT

Note. If the vehicle is to be driven off the rear of the platform, attach the drive-off aid to the outside tiedown rings on each side with a type V tie-down clevis.

FRONT PLATFORM ATTACHMENT

Note. If the vehicle is to be driven off the front of the platform, tie a length of type VIII nylon webbing from the second bushing of the front tandem link assembly, through the end loop of the drive-off aid, and through the nearest tie-down ring. When attaching the drive-off aid to the type V platform using type VIII nylon webbing, tie the free ends with a ring bend knot as shown in Figure 1-5. Tie the drive-off aid to tie-down rings or platform bushings with type I, 1/4-inch cotton webbing.

Figure 2-9. Drive-off Aids Installed on Platform
CENTER OF BALANCE (CB)

2-9. The CB of an airdrop platform load, based on the total rigged weight, is given in the rigging manual for a particular item. If the load varies from the one given in a particular manual, the CB must be recomputed using the procedures shown in Figure 1-4.

Note. Wrap the drive-off aid around the wheel of the vehicle on each side as shown in the specific manual for that vehicle. Wrap the drive-off aid around the wheel until the webbing lays flat on the platform, but is not under tension. Tie the drive-off aid to adjacent tie-down rings or platform bushings on each side with type I, 1/4-inch cotton webbing.

Figure 2-10. Drive-off Aids Installed on Wheel of Vehicle
Chapter 3  
Suspension Slings  

SECTION I-GENERAL INFORMATION  

LINE MULTI-LOOP  

3-1. A line, multi-loop, (Figure 3-1) is used as suspension slings on platform loads rigged for low-velocity airdrop. These slings suspend the load under the cargo parachute during descent. Suspension slings connect the cargo parachute to the load using a parachute release assembly. A line, multi-loop, may also be used as deployment lines and to extend the risers of cargo parachutes or to group the briddles of a multi-parachute load.

Note. Tube edge nylon webbing suspension slings are an authorized substitute for the type XXVI nylon webbing slings. The combination of both tube edge nylon webbing and type XXVI nylon webbing slings are authorized in any configuration due to the same material characteristics.

Figure 3-1. Suspension Slings  

Each sling is made with continuous loops. The loops are 1 3/4-inch-wide, type XXVI nylon webbing. They are held together with keepers made of 1-inch, nylon reinforced tape. Each sling has a sliding webbing keeper and a cotton or nylon buffer at each end.

Note. The keeper at each end of the sling must be drawn snugly against the object on which the sling is fitted.
REQUIREMENTS

3-2. The size and number of suspension slings needed to rig an airdrop platform load for low-velocity airdrop depend on the suspended weight of the load. The size and number of suspension slings needed at each suspension point are listed in Table 3-1. The types and lengths of suspension slings authorized for use when a platform load is rigged for low-velocity airdrop are listed in Table 3-2. Each rigging manual lists the specific slings used on each load.

Table 3-1. Size and Number of Cargo Slings Required for Airdrop Platform Loads

<table>
<thead>
<tr>
<th>Weight of Rigged Load Without Cargo Parachutes (pounds)</th>
<th>Type XXVI Nylon Webbing Cargo Slings at Each Suspension Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>2270 to 14,000</td>
<td>1 each (2-loop)</td>
</tr>
<tr>
<td>14,001 to 40,000</td>
<td>1 each (4-loop)</td>
</tr>
</tbody>
</table>

Table 3-2. Type XXVI Nylon Webbing Suspension Slings for Low-Velocity Airdrop

<table>
<thead>
<tr>
<th>National Stock Number</th>
<th>Length (feet)</th>
<th>Number of Loops</th>
</tr>
</thead>
<tbody>
<tr>
<td>1670-01-062-6301</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>1670-01-062-6306</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1670-01-062-6304</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>1670-01-062-6305</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>1670-01-063-7760</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>1670-01-062-6310</td>
<td>11</td>
<td>4</td>
</tr>
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</tr>
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<td>1670-01-062-6307</td>
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</tr>
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</tr>
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<td>4</td>
</tr>
<tr>
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<td>2</td>
</tr>
<tr>
<td>1670-01-064-4453</td>
<td>20</td>
<td>4</td>
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</tbody>
</table>
SECTION II-RIGGING INFORMATION

ATTACHING SLINGS

3-3. The specific rigging manual includes the length and loops of suspension slings needed and the method used to connect them to the platform or drop item. When suspension slings must be joined to form a longer suspension sling, a two-point link may be used. Attach suspension slings to the suspension bracket assembly or tandem links using large suspension clevises. When using a double suspension clevis configuration, follow the procedures in Figure 3-2.

CAUTION

Ensure the nut is wrench tightened to keep it from loosening during transport and airdrop.

1 Use a single length of type III nylon cord to route a running end through and around the clevises forming an X on the top clevis.

2 Secure with a slip knot ensuring the clevises are centered on each other.

Figure 3-2. Double Suspension Clevis Configuration Safety Tied
SAFETY TIEING SLINGS

3-4. Safety tieing the suspension slings keeps them from entangling with the load. Safety tie the slings according to the instructions given in the specific rigging manual for the particular load.

Note. When using four-loop, type XXVI suspension slings, wrap each set of four plies with a 10- by 10-inch piece of cotton muslin. Secure each wrap with one single turn of 1/4-inch cotton webbing.

- **Deadman’s Tie.** Safety tie all suspension slings with a deadman’s tie as shown in Figure 3-3.

**CAUTION**

This tie must be located between 6 and 8 inches above the top of the load or as directed in the specific rigging manual.

1. Cut two lengths of 1/2-inch tubular nylon webbing, making each long enough to encircle all slings plus 8 feet. Mark the lengths of webbing at their centers. Pass an end of both pieces of webbing through the center plies of the right front sling until the marks reach the sling.

2. Pass the running end of each length around the inboard side. Tie it on the outboard side with a surgeon’s knot, a locking knot, and an overhand knot in the running ends.

Figure 3-3. Safety Slings Tied with a Deadman’s Tie
3 Pass one running end to the left front sling, through the center plies, around the inside of the plies to the outside. Tie it to the inside of the plies with three alternating half hitches and an overhand knot in the running end.

4 Repeat step 3 for the right rear sling.

5 Run both ends of the webbing through the center plies of the left rear sling and around the inboard side of the sling to the outboard side. Safety tie it with a surgeon's knot, a locking knot, and an overhand knot in the free ends.

6 Tape the webbing to the slings.

Note. Make sure the safety tie allows the slings to suspend in their natural position.

Figure 3-3. Safety Slings Tied with a Deadman’s Tie (Continued)
• **Modified Deadman’s Tie.** Safety tie suspension slings with a modified deadman’s tie when specified by the individual rigging manual and as shown in Figure 3-4.

1 Cut two lengths of 1/2-inch tubular nylon webbing, making each long enough to reach from the left suspension sling to the right suspension sling plus 8 feet. Split the plies of the front suspension sling. Route two lengths of the 1/2-inch tubular webbing through the plies of the sling from inboard to outboard about 3 feet.

2 Route the 3-foot running end from outboard to inboard around the inside plies and around the outboard plies from inboard to outboard. Tie it in place on the inboard side with three alternating half-hitches with an overhand knot in the running end.

**Figure 3-4. Safety Slings Tied with a Modified Deadman’s Tie**
Split the plies of the right suspension sling and route the running ends of the two lengths of 1/2-inch tubular nylon webbing through the plies of the sling from inboard to outboard. Pass enough of the webbing through the sling to take the slack out, but not enough to keep the slings from hanging in their natural position.

Route the running end from outboard to inboard around the inside plies and around the outboard plies from inboard to outboard. Tie it in place on the inboard side with three alternating half-hitches with an overhand knot in the running end.

Tape the webbing to the slings with masking tape.

Figure 3-4. Safety Slings Tied with a Modified Deadman’s Tie (Continued)
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Chapter 4
Lashings

SECTION I-GENERAL INFORMATION

USE

4-1. The drop item and the accompanying load are lashed to the platform to prevent damage to the load or to the aircraft during airdrop. The accompanying load is lashed to the platform to withstand the same force as the drop item.

COMPONENTS AND STRENGTHS

4-2. The components of the lashings used on airdrop loads are shown in Figure 4-1. The effective strength of a lashing is determined by the angle of lashing. Table 4-1 illustrates a method of determining lashing effectiveness forward, aft, lateral, and vertical thrusts. The maximum strengths of the various forms of lashings are given in Figure 4-2.

![Figure 4-1. Components of a Tiedown Assembly]

1 15-foot Dacron tiedown strap
2 Heavy-duty D-ring
3 10,000-pound-capacity load binder
Table 4-1. Lashing Effectiveness

This figure illustrates a method of determining restraint provided by a given airdrop tiedown. As illustrated, tiedown ratios can be determined by dividing the directional distance in which restraint is required by the strap length. This ratio is then multiplied by the strength of the tiedown strap or attachment point, whichever is less, to find the effective restraint received from the tiedown pattern used.

**EXAMPLE:** (Note: Quantities used are from the example above)

1) First, measure the tiedown strap length (A) from the attachment point on the airdrop load to the tiedown fitting on the airdrop platform (50 inches). You will use this measurement in each calculation.

2) **Calculating the Vertical Restraint:**
   
   a) For determining vertical restraint, measure the vertical dimension (B) from the attachment point on the airdrop load to a point directly beneath it on the airdrop platform surface (25 inches).
   
   b) Divide the vertical dimension (B) by the tiedown strap length (A) to determine a ratio:
      
      \[
      \frac{25}{50} = 0.50 \text{RATIO}
      \]
   
   c) Multiply this ratio by the rated strength of the tiedown strap or tiedown fitting, whichever is less:
      
      \[
      0.50 \times 10,000^\circ = 5,000 \text{POUNDS}
      \]
      
      Vertical restraint received from strap

3) **Calculating the Forward or Aft Restraint:**
   
   a) For determining forward or aft restraint, obtain a forward or aft dimension (C) by measuring from a point directly beneath the attachment point on the airdrop load along a longitudinal axis to a point lateral to the tiedown fitting being used on the airdrop platform (37 inches).
   
   b) Divide the forward or aft dimension (C) by the tiedown strap length (A) to determine a ratio:
      
      \[
      \frac{37}{50} = 0.74 \text{RATIO}
      \]
   
   c) Multiply this ratio by the rated strength of the tiedown strap or tiedown fitting, whichever is less:
      
      \[
      0.74 \times 10,000^\circ = 7,400 \text{POUNDS}
      \]
      
      Fwd or aft restraint received from strap

4) **Calculating the Lateral Restraint:**
   
   a) For determining lateral restraint, obtain a lateral dimension (D) by measuring from a point directly beneath the attachment point on the platform surface to the sidereal of the platform (22 inches).
   
   b) Divide the lateral dimension (D) by the tiedown strap length (A) to determine a ratio:
      
      \[
      \frac{22}{50} = 0.44 \text{RATIO}
      \]
   
   c) Multiply this ratio by the rated strength of the tiedown strap or tiedown fitting, whichever is less:
      
      \[
      0.44 \times 10,000^\circ = 4,400 \text{POUNDS}
      \]
      
      Lateral restraint received from strap

* This quantity should always represent the weakest link in the system. If the rated strength of the strap or attachment point being used is less than 10,000 pounds, the ratio should be multiplied by the weakest rated strength in Example. A panel tiedown ring rated strength is 5,000 pounds.
SINGLE LINE CONFIGURATION

1. A dacron lashing routed in a single line configuration has a maximum strength of 6,000 pounds when attached to a type V platform side rail and a tiedown clevis. It has a maximum strength of 5,000 pounds when attached to a panel tiedown ring.

LOOPTED (FLOATING BINDER) CONFIGURATION

2. A dacron lashing routed in a double line looped (floating binder) configuration has a maximum strength of 10,000 pounds when attached to a type V platform side rail and a tiedown clevis. It has a maximum strength of 5,000 pounds when attached to a panel tiedown ring.

Figure 4-2. Strengths of Dacron Lashings
SECTION II-RIGGING INFORMATION

FITTING D-RINGS

4-3. Fit a D-ring to the end of each tiedown strap as shown in Figure 4-3.

LASHING LOAD

4-4. Lash a low-velocity airdrop load to the platform according to the instructions in the specific rigging manual. Install the lashings as shown in Figures 4-4 and 4-5. When a load is rigged for which there is no specific rigging manual, lashings must provide restraint to withstand extraction, deployment recovery, and ground impact forces. Airdrop loads that do not have specific rigging procedures must be restrained to the airdrop platform to the following criteria: 3Gs forward, 2.25 Gs aft, 1.5 Gs lateral, and 2 Gs vertical. The total force that is necessary to restrain a load in a given direction is determined by multiplying the weight of the load times the specific G value for that restraint direction. Lashing effective strength is determined as shown in Table 4-1.

1. Run the free end of the tiedown strap through the large opening in the D-ring.
2. Run the strap around and through the small opening in the D-ring.
3. Run the strap back through the large opening in the D-ring.
4. Pull the strap taut.

Figure 4-3. D-Ring Fitted to Tiedown Strap
CAUTION
Do not tighten the lashings so tight that they cause the platform to bow.

1 Pass the free end of one tiedown strap through a clevis on the right rail and through its own D-ring. Pull the strap taut.
2 Run the free end of the strap up over the load.
3 Pass the free end of a second tiedown strap through a clevis on the left rail and through its own D-ring. Pull the strap taut.
4 Run the free end of the strap up over the load.
5 Fit a D-ring on the free end of each strap as described in Figure 4-3, and place the D-rings on the hooks of a load binder. Safety the binder handle closed as shown in Figure 4-6.

Notes.
1. When the tiedown strap length is not a factor, it is permissible to use a single tiedown strap and D-ring with a load binder attached directly to a side rail clevis or tiedown ring.
2. Pad all sharp edges that may touch the strap with cellulose wadding or other suitable material.

Figure 4-4. Single Line Lashing
1. Pass the free end of a tiedown strap through a clevis on a rail and up and over, around, or through the indicated tiedown provision on the load. The tiedown provision will be listed in the specific rigging manual for a particular load. Run the strap back toward the clevis.

2. Fit a D-ring to the free end of the strap (Figure 4-3), and place the D-rings on the hooks of a load binder. Close the handle of the load binder pointing toward the platform.

3. Close the handle of the load binder toward the load.

Figure 4-5. A Loopd (Floating Binder) Lashing
SAFETY TIEING LOAD BINDER HANDLES

4-5. Roll the excess tiedown strap, and place alongside the load binder handle. Safety tie the load binder handle closed as shown in Figure 4-6.

1 After the handle of the load binder has been closed, roll any excess tiedown strap and place the folds alongside the load binder handle. Tie the rolled webbing to the binder and the binder handle closed with a single length of type I, 1/4-inch cotton webbing.

2 Roll any excess from the opposite tiedown strap and place on top of the lashing. Tie the rolled webbing to the lashing with a single length of type I, 1/4-inch cotton webbing.

Figure 4-6. Load Binder Handle and Excess Webbing Safety Tied
FORMING A 30-FOOT, 45-FOOT, OR GREATER LENGTH TIEDOWN STRAP

4-6. When needed, attach 15-foot tiedown straps together to form a 30-foot, 45-foot, or greater length tiedown strap as shown in Figure 4-7.

1. Run the free end of two 15-foot tiedown straps through the D-ring of the opposite strap to form a 30-foot strap.
2. Pull the straps taut.
3. Install a D-ring on a free end of the 30-foot strap. Pass the free end of a 15-foot tiedown strap through the installed D-ring and back through its own D-ring to form a 45-foot or greater strap.
4. Insert a 2- by 5-inch piece of 1/2-inch felt around the installed D-ring.

*Note.* Make sure the felt is centered around the installed D-ring.

*Figure 4-7. A 30-Foot, 45-Foot, or Greater Length Tiedown Strap Formed*
Chapter 5
Cargo Parachutes

SECTION I-GENERAL INFORMATION

USE
5-1. Cargo parachutes, also called recovery parachutes, are used to slow the descent of a low-velocity platform load. Table 5-1 lists the weight limitations for cargo parachutes used with airdrop platform loads.

TYPES
5-2. The following cargo parachutes are used when loads are rigged for low-velocity airdrop.
- **G-11B Cargo Parachute.** The parachute has a 100-foot-diameter canopy. It has 120 suspension lines (35-foot, type III nylon cord). The apex vent lines have been pulled down with a 95-foot, type V nylon webbing center line. The parachute has four 2-second cutters. When packed, the assembly weighs 250 pounds.
- **G-11C Cargo Parachute.** This is the same parachute as the G-11B except this parachute has two 2-second cutters with two reusable reefing lines. The apex vent lines have been pulled down with a 100-foot, type V nylon webbing center line. When packed, the assembly weighs 250 pounds.
- **G-12E Cargo Parachute.** This parachute has a 64-foot-diameter canopy. It has sixty-four 51-foot, type IV braided nylon cord suspension lines. The apex vent lines have been pulled down with a 55-foot, type V nylon webbing center line. When packed, the assembly weighs 125 pounds.

<table>
<thead>
<tr>
<th>Parachutes</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-11B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2,270</td>
<td>5,000</td>
</tr>
<tr>
<td>2</td>
<td>5,001</td>
<td>10,000</td>
</tr>
<tr>
<td>3</td>
<td>10,001</td>
<td>15,000</td>
</tr>
<tr>
<td>4</td>
<td>15,001</td>
<td>20,000</td>
</tr>
<tr>
<td>G-11C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>20,001</td>
<td>25,000</td>
</tr>
<tr>
<td>6</td>
<td>25,001</td>
<td>30,000</td>
</tr>
<tr>
<td>7</td>
<td>30,001</td>
<td>35,000</td>
</tr>
<tr>
<td>8</td>
<td>35,001</td>
<td>40,000</td>
</tr>
<tr>
<td>G-11E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2,270</td>
<td>3,500</td>
</tr>
</tbody>
</table>
Note. Suspended weight in pounds is the total rigged weight less the weight of the cargo parachutes.

RISER EXTENSIONS

5-3. Cargo parachutes are used singularly or in a cluster. When parachutes are used in a cluster, the risers of each parachute are lengthened so the canopies remain almost vertical as they descend to increase the effectiveness of each canopy. The length of a riser extension and the number of stows used in stowing the extensions are given in Table 5-2.

Table 5-2. Riser Requirements for G-11B, G-11C, and G-12E Cargo Parachutes

<table>
<thead>
<tr>
<th>Number of Parachutes</th>
<th>Length of Riser Extension (feet)</th>
<th>Number of Extension Stows</th>
<th>Type XXVI Nylon Webbing Slings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3-foot (2-loop)</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>2</td>
<td>20-foot (2-loop)</td>
</tr>
<tr>
<td>3 or 4</td>
<td>60</td>
<td>8</td>
<td>6-foot (3-loop)</td>
</tr>
<tr>
<td>5 to 8</td>
<td>120</td>
<td>16</td>
<td>120-foot (2-loop)</td>
</tr>
</tbody>
</table>

Notes.
1. All riser extensions must be continuous type XXVI nylon slings. Each parachute must have identical riser extensions and each must be of the same length.
2. G-12E parachutes have three stows.

SECTION II-RIGGING INFORMATION

FORMING AND BOLTING RISER EXTENSIONS

5-4. The risers of a cluster of cargo parachutes used on low-velocity airdrop loads must be extended (lengthened) using the following methods.

- **Forming Extensions.** Only continuous riser extensions may be used.
- **Bolting Extensions to Risers.** Bolt the riser extension to the risers of a cargo parachute as shown in Figure 5-1.
1. Route a clevis cover around one end of the riser extension.

2. Attach the riser extension to the bolt of the parachute clevis.

**CAUTION**

Ensure the nut is wrench tightened to keep it from loosening during transport and airdrop.

3. Route the clevis cover up over the bolt of the clevis and girth-hitch a length of type I, 1/4-inch cotton webbing to the single grommet on the rear of the cover. Route one of the running ends of the 1/4-inch cotton webbing between the center of the clevis and through both remaining grommets, and secure on top with a surgeon’s knot and a locking knot.

4. Rotate the parachute clevis until the riser extension is facing the top of the deployment bag. Tie the clevis to the left bag carrying handle using a double length of type I, 1/4-inch cotton webbing.

Figure 5-1. Riser Extension Bolted to Risers
STOWING RISER EXTENSIONS

5-5. The riser extensions for the parachutes must be stowed as described below.

- **G-12E Cargo Parachute.** There are two deployment bags that may be used in packing the G-12E. There is the modified G-12 deployment bag, Part Identification Number (PIN) 54K6299 or the G-12E deployment bag, PIN 11-1-3967. Stow the riser extension as shown in Figures 5-2 and 5-3.

- **G-11B or G-11C Cargo Parachute.** Stow the riser extensions of a G-11B or G-11C cargo parachute as shown in Figures 5-4 and 5-5.

![Modified G-12 Deployment Bag (PIN 54K6299)](image)

- **Step 1:** Start at the end of the riser extension fitted to the clevis (step 2, Figure 5-1) and S-fold the extension into the riser extension compartment forming three stows.
- **Step 2:** Leave approximately 3 feet of the free end of the extension outside the riser end of the compartment.
- **Step 3:** Tie each stow to a riser extension loop with one turn single of type I, 1/4-inch cotton webbing.

Figure 5-2. Riser Extension of a Modified G-12 Deployment Cargo Parachute Stowed
Open the riser extension flap which is attached with type I, 1/4-inch cotton webbing.

Start at the end of the riser extension fitted to the clevis and S-fold the extension into the riser extension compartment forming three stows.

Leave approximately 3 feet of the free end of the extension outside the riser extension compartment. (Not shown)

**CAUTION**

Do not girth hitch the type I, ¼-inch cotton webbing ties to the riser extension securing line.

Tie each stow to a riser extension loop with one turn single of type I, 1/4-inch cotton webbing.

Close the riser flap according to TM 10-1670-281-23&P/NAVAIR 13-1-32/TO 13C5-32-2. (Not shown)

Figure 5-3. Riser Extension of a G-12 Deployment Cargo Parachute Stowed
Note. The nylon deployment bags have the riser extension securing line permanently attached.

1. Open the riser extension flap which is attached with type I, 1/4-inch cotton webbing.
2. Start at the end of the riser extension fitted to the clevis and S-fold the extension into the riser extension compartment.
3. Leave approximately 3 feet of the free end of the extension outside the riser end of the compartment. (Not shown)
4. Tie each stow to the riser extension securing line with one turn double, type I, 1/4-inch cotton webbing.

CAUTION
Do not girth hitch the type I, ¼-inch cotton webbing ties to the riser extension securing line.


Figure 5-4. Riser Extension of a G-11 Cargo Parachute (Nylon Bag) Installed and Stowed
1. Fold an 8-foot length of 1/2-inch tubular nylon webbing in half lengthwise. Run the loop in the folded end through the right carrying handle. Run the free ends of the webbing through this loop, and pull the webbing taut.

2. Run the webbing across the parachute, passing it through the riser extension retaining loops (end tabs).

   *Note.* Do not pull the webbing tight across the parachute.

3. Tie the webbing to the left front carrying handle with three alternating half hitches and an overhand knot in each free running end.

4. Start at the end of the riser extension fitted to the clevis and S-fold the extension into the riser extension compartment.

5. Leave about 3 feet of the free end of the extension outside the riser end of the compartment.

6. Tie each stow to the riser extension securing line with one turn double type I, 1/4-inch cotton webbing.

   **CAUTION**
   Do not girth hitch the type I, 1/4-inch cotton webbing ties to the riser extension securing line.

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Figure 5-4. Riser Extension Securing Line of a G-11 Cargo Parachute (Cotton Bag) Installed and Riser Extension Stowed (Continued)
Figure 5-5. The 20-, 60-, and 120-Foot Riser Extensions Stowed
STOWING CARGO PARACHUTES

5-6. When referring to cargo parachutes, stowing consists of three steps. First, place the cargo parachutes on the load or on a parachute stowage platform. Second, cluster the parachutes by tying their deployment bags handles together. Third, group the bridles of a multiparachute load. When attaching parachute bridles to the clevis, make sure they are not twisted, misrouted, or entangled. Route parachute bridles straight from the D-bag to the clevis. Stow the parachutes as shown in Figures 5-6 through 5-14.

Note. Nylon and cotton bags may be mixed on the same load.

USING DEPLOYMENT LINES

5-7. The correct size and length of the deployment line will be given in each specific rigging manual. As a rule, use 9-foot, (2-loop), type XXVI nylon slings as deployment lines. One end of the deployment line is fitted to the coupling link assembly of the EFTC. The other end of the line is fitted to the bolt of the large clevis grouping the bridles of a cluster of parachutes.

Note. 4-loop slings may be substituted for 2-loop slings for deployment lines.

1 Set one parachute on the load or on a parachute stowage platform with the riser compartment up and with the bridle toward the rear of the platform.

2 Fit a large clevis to the bridle loop.

3 For the nylon bag tie the clevis to the right parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot. (Not shown) For the cotton bag tie the clevis to the right bridle attaching loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot.

Figure 5-6. One Parachute Stowed
1. Set two parachutes side by side on the load with the riser compartments up and the bridles toward the rear of the platform.

2. Tie the inside front and rear cluster attaching loops (hereafter called carrying handles) together with one turn single of type III nylon cord.

Note. G-12E cargo parachutes are tied together with the clustering straps on each corner of the deployment bag or with a single length of type III nylon cord through the bag carrying handles unless the individual rigging manual states otherwise.

3. Fit the bridle loops on the arms of a large clevis.

4. For the nylon bag tie the clevis to the right parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot. For the cotton bag tie the clevis to the right bridle attaching loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot.

Figure 5-7. Two Parachutes Stowed Side by Side
1. Stack two parachutes with the riser compartment of the bottom parachute down and the riser compartment of the top parachute up.

2. Tie the outside front and rear carrying handles together with one turn single of type III nylon cord.

**Note.** G-12E cargo parachutes are tied together with the clustering straps on each corner of the deployment bag or with a single length of type III nylon cord through the bag carrying handles unless the individual rigging manual states otherwise.

3. Fit the bridle loops on the arms of a large clevis.

4. For the nylon bag tie the clevis to the top right parachute left parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot. For the cotton bag tie the clevis to the top right parachute’s left bridle attaching loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot.

**Figure 5-8. Two Parachutes Stowed and Stacked**
1 Set two parachutes side by side on the load with the riser compartments down and the bridle toward the rear of the platform.

2 Center one parachute on top of the two parachutes in step 1 above with the riser compartment up.

3 Tie the front and rear carrying handles together with a single length of type III nylon cord.

4 Fit the bridle loops on the arms of a large clevis.

5 For the nylon bag tie the clevis to the top right parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot. For the cotton bag tie the clevis to the top right bridle attaching loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot.

Figure 5-9. Three Parachutes Stowed
1. Set two parachutes side by side on the load with the riser compartments down and with bridles toward the rear of the platform.

2. Set two parachutes side by side on top of the two parachutes in step 1 above with the riser compartments up.

3. Tie the four center front and four center rear carrying handles together with a single length of type III nylon cord. Tie the outside carrying handles together with type III nylon cord.

4. Fit the bridle loops on the arms of a large clevis.

5. For the nylon bag tie the clevis to the top right parachute left parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot. For the cotton bag tie the clevis to the top right parachute’s left bridle attaching loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot.

Figure 5-10. Four Parachutes Stowed
1. Set three parachutes side by side on the load with the riser compartments down and the bridles toward the rear of the platform.

2. Center two parachutes on top of the three parachutes in step 1 above with the riser compartments up.

3. Tie the front and rear carrying handles together with a single length of type III nylon cord.

4. Fit the bridles of the left three parachutes on the arms of a large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the two right parachutes on the arms of a second clevis, and fit a 3-foot sling on the clevis bolt. Fit the ends of the two 3-foot slings on the arms of a third clevis. Tie each clevis to a bridle attaching loop with a double length of type I, 1/4-inch cotton webbing. For the nylon bag tie each clevis to a parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon’s knot and a locking knot.

Figure 5-11. Five Parachutes Stowed
1. Set three parachutes side by side on the load with the riser compartments down and with the bridles toward the rear of the platform.

2. Set three parachutes on top of the parachutes in step 1 above with the riser compartments up.

3. Tie the inside front four carrying handles together with a single length of type III nylon cord on all the bags. Repeat for the rear four carrying handles.

4. Tie the outside front two and rear two carrying handles together with a single length of type III nylon cord.

5. Fit the bridles of the left stack of parachutes on the arms of a large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the center stack of parachutes on the arms of a second large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the right stack of parachutes on the arms of a third large clevis, and fit a 3-foot sling on the clevis bolt. Fit the ends of the 3-foot slings on the arms of a fourth large clevis.

6. For the cotton bag tie each clevis to a bridle attaching loop with a doubled length of type I 1/4-inch cotton webbing and secure with a surgeon’s knot and a locking knot. For the nylon bag tie each clevis to a parachute restraint strap loop with a doubled length of type I, 1/4-inch cotton webbing and secure with a surgeon’s knot and a locking knot.

Figure 5-12. Six Parachutes Stowed
CAUTION
The front clustering ties MUST NOT interfere with the deployment of the parachutes.

1. Set three parachutes side by side on the load with the riser compartments down and with the bridles toward the rear of the platform.
2. Set three parachutes on top of the parachutes in step 1 above with the riser compartments up.
3. Set a parachute on top of the center parachutes with the riser compartment up.
4. Tie the inside front four and rear four carrying handles together with lengths of 1/2-inch tubular nylon webbing. Tie the two outside corners of the middle and bottom parachutes together with lengths of 1/2-tubular nylon webbing. Tie the top two front and top two rear parachute carrying handles to the outside carrying handles of the middle parachutes using 1/2-inch tubular nylon webbing.
5. Fit the bridles of the left stack and top parachute on the arms of a large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the center two parachutes on the arms of a second large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the right stack of parachutes on the arms of a third large clevis, and fit a 3-foot sling on the clevis bolt. Fit the ends of the 3-foot slings on the arms of a fourth large clevis.
6. For the cotton bag tie each clevis to a bridle attaching loop with a doubled length of type I, 1/4-inch cotton webbing and secure with a surgeon’s knot and a locking knot. For the nylon bag tie each clevis to a parachute restraint strap loop with a doubled length of type I, 1/4-inch cotton webbing and secure with a surgeon’s knot and a locking knot.

Figure 5-13. Seven Parachutes Stowed
CAUTION

The front clustering ties MUST NOT interfere with the deployment of the parachutes.

1. Set three parachutes side by side on the load with the riser compartments down and with the bridles toward the rear of the platform.

2. Set three parachutes on top of the parachutes in step 1 above with the riser compartments up.

3. Set two parachutes on top of the parachutes in step 2 with the riser compartments up.

4. Tie the inside front four and rear four carrying handles of the middle and bottom parachutes together with lengths of 1/2-inch tubular nylon webbing. Tie the two top front and rear inside carrying handles with lengths of 1/2-tubular nylon webbing. Tie the two outside front and rear carrying handles of the middle and bottom parachutes with lengths of 1/2-inch tubular nylon webbing. Tie the top two outside front and rear parachute carrying handles to the outside front and rear carrying handles of the middle parachutes together using 1/2-inch tubular nylon webbing.

5. Fit the bridles of the left stack and the left top parachute on the arms of a large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the center stack of parachutes on the arms of a second large clevis, and fit a 3-foot sling on the clevis bolt. Fit the bridles of the right stack and the right top parachute on the arms of a third large clevis, and fit a 3-foot sling on the clevis bolt. Fit the ends of the 3-foot slings on the arms of a fourth large clevis.

6. For the cotton bag tie each clevis to a bridle attaching loop with a doubled length of type I, 1/4-inch cotton webbing and secure with a surgeon’s knot and a locking knot. For the nylon bag tie each clevis to a parachute restraint strap loop with a doubled length of type I, 1/4-inch cotton webbing and secure with a surgeon’s knot and a locking knot.

Figure 5-14. Eight Parachutes Stowed
RESTRAINING ONE PARACHUTE

5-8. Restrain one cargo parachute as shown in Figure 5-15.

CAUTION
Be sure that each point to which a restraining tie is made can withstand a pull of 550 pounds.

1 Tie each corner carrying handle to a convenient point on the drop item or platform with a single length of type III nylon cord.

Figure 5-15. One Parachute Restrained
RESTRAINING TWO TO EIGHT PARACHUTES

5-9. The following parachute restraint systems are used to restrain two to eight cargo parachutes.

**CAUTION**
Ensure tension is tight on the multi-knife straps.

- **Two Parachutes.** Restrain two cargo parachutes as shown in Figures 5-16 and 5-17. The restraint system for two cargo parachutes consists of one length of type VIII nylon webbing (restraint strap). When using a guillotine knife parachute release strap follow Figures 5-18 and 5-19. When using a multicut parachute release strap follow Figures 5-20 and 5-21.

1. Tie a trucker’s hitch a suitable distance in each end of the restraint strap.
2. Run each free end of the strap through or around the indicated point on the load and back up through the trucker’s hitch.

**Note.** The indicated point for tying the parachute restraint strap to the load will be given in the specific rigging manual.
3. Pull on both ends of the restraint strap at the same time. When the strap is tight, tie the ends with three alternating half hitches and an overhand knot in the running end.

Figure 5-16. Restraint Strap Tied
**Note.** The restraint strap must run through the parachute stowage platform.

1. Restraint strap
2. Release strap
3. Trucker’s hitch
4. Half hitches and overhand knot

**Figure 5-17. Two Parachutes Restrained**
1 Run the restraint strap through the center carrying handles on the left side of the parachutes, up and across the top of the parachutes, and down through the center carrying handles on the right side of the parachutes. Tie the restraint strap to the load as described in Figure 5-16.

2 Close the knife around the restraint strap, knurled nut up. Thread a length of type I, 1/4-inch cotton webbing through the safety tie hole. Even the ends of the webbing, and run them under the restraint strap, and alongside the release knife.

Figure 5-18. Single-knife Parachute Release Strap Installed on Two Stacked Parachutes
3 Thread the end of the webbing on the left side of the knife to the right behind the bar of the knife. Thread the other end of webbing to the left in a like manner.

4 Bring the ends of the webbing up over the top of the bar. Tie the ends of the webbing together with a surgeon's knot and a locking knot.

5 Run the free end of the release strap around the large clevis grouping the bridles and back up through the friction adapter.

6 Pull the release strap tight. Fold or roll the excess strap, and tape or tie the folds in place.

Note. Be sure the release strap is tight so that the knife will cut the restraint strap before the extraction force is transferred to the parachute bridles.

Figure 5-18. Single-knife Parachute Release Strap Installed on Two Stacked Parachutes (Continued)
Run the restraint strap up through the outside carrying handle of the left parachute, across the left parachute, down through the inside center carrying handle of the left parachute, up through the inside center carrying handle of the right parachute, across the right parachute, and down through the outside center carrying handle of the right parachute. Tie the restraint strap to the load as described earlier in this chapter.

Close the knife around the restraint strap with the knurled nut up, between the inside carrying handles. Thread a length of type I, 1/4-inch cotton webbing through the safety tie hole. Even the ends of the webbing, and run them under the restraint strap, and alongside the release knife. Thread the end of the webbing on the left of the knife to the right behind the bar of the knife. Thread the other end of webbing to the left in a like manner. Bring the ends of the webbing up over the top of the bar. Tie the ends of the webbing together with a surgeon's knot and locking knot as shown earlier. Run the free end of the release strap down through the large clevis grouping the bridles and back up through the friction adapter as described in earlier in this chapter.

Pull the release strap tight. Fold or roll the excess strap, and tape or tie the folds in place as described earlier in this chapter.

Note. Be sure the release strap is tight so that the knife will cut the restraint strap before the extraction force is transferred to the parachute bridles.

Figure 5-19. Single-Knife Parachute Release Strap Installed on Two Side-by-Side Parachutes
1. Remove guillotine knives number 2 and 3 (Figure 1-2) from each multicut parachute release straps. Fold the unused loops, and tape the folds in place.

2. Tie the restraint strap to the load as described earlier in this chapter.

3. Close each knife around the restraint strap, with the knurled nut up. Secure as shown earlier in this chapter.

4. Tie the free end of each release strap to the large clevis grouping the bridles. Use three alternating half hitches and an overhand knot in each running end. Make sure that the parachute release straps are not routed under the parachute restraint or parachute bridles. Make sure that the release straps are shorter than the parachute bridles to ensure that the deployment force is applied to the strap before the bridles.

*Note.* Ensure tension is tight on the multi-knife.

5. Fold or roll any excess strap, and tape the folds in place.

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*Figure 5-20. Multicut Parachute Release Straps Installed on Two Side-by-Side Parachutes*
1. Remove guillotine knives number 2 and 3 (Figure 1-2) from each multicut parachute release straps. Fold the unused loops, and tape the folds in place.

2. Tie the restraint strap to the load as described earlier in this chapter.

3. Close each knife around the restraint strap, with the knurled nut out between the top and bottom carrying handles. Secure as shown earlier in this chapter.

4. Tie the free end of each release strap to the large clevis grouping the bridles. Use three alternating half hitches and an overhand knot in each running end. Make sure that the parachute release straps are not routed under the parachute restraint or parachute bridles. Make sure that the release straps are shorter than the parachute bridles to ensure that the deployment force is applied to the strap before the bridles.

**Note.** Ensure the release straps are tied evenly so the guillotine knives cut simultaneously.

5. Fold or roll any excess strap, and tape the folds in place.

Figure 5-21. Multicut Parachute Release Straps Installed on Two Stacked Parachutes
Three to Five Parachutes. The restraint system for three to five cargo parachutes consists of two lengths of type VIII nylon webbing (restraint strap) and two multicut parachute release straps. Restrain three to five cargo parachutes as shown in Figures 5-22 through 5-24.

Note. Always use multicut parachute release straps in pairs.

1. Install the first restraint strap as described earlier in this chapter.
2. Run the second restraint strap through the outside rear carrying handle of the bottom left parachute, up through the top left rear carrying handle and both bridle attaching loops of the top parachute for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the outside rear carrying handles of the top and bottom right parachute. Tie the restraint strap to the load as described earlier in this chapter.
3. Remove guillotine knife number 3 (Figure 1-2) from each of two multicut parachute release straps. Fold the unused loops, and tape the folds in place.
4. Close and safety the guillotine knives as described earlier in this chapter.
5. Tie the release straps to the large clevis as described earlier in this chapter.

Note. Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

Figure 5-22. Three Parachutes Restrained and Multi-Knife Installed
Note. Always use multicut release straps in pairs.

1. Run the restraint strap through the center carrying handles on the left side of the parachutes. Run the restraint strap over the top of the parachute, and down through the left inside center carrying handle. Continue to run the restraint strap up through the right inside center carrying handle. Run the restraint strap over the right parachute and down to the right outside carrying handles. Tie the ends of the restraint strap to the load as described earlier in this chapter.

2. Run the second restraint strap through the outside rear carrying handles of the left parachutes. Run the restraint strap through the bridle attaching loops of the top parachutes for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the outside rear carrying handles of the right parachutes. Tie the ends of the restraint strap to the load as described earlier in this chapter.

3. Remove guillotine knife number 3 (Figure 1-2) from each of two multicut parachute release straps. Fold the unused loops, and tape the folds in place.

4. Close and safety the guillotine knives as described earlier in this chapter.

5. Tie the release straps to the large clevis as described earlier in this chapter.

Note. Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

Figure 5-23. Four Parachutes Restrained and Multi-Knife Installed
1. Install the first and second restraint straps and two multicut parachute release straps as shown earlier in this chapter.

**Note.** Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

**Figure 5-24. Five Parachutes Restrained and Multi-Knife Installed**
- **Six, Seven, or Eight Parachutes.** The restraint system for six, seven, or eight cargo parachutes consists of three type X restraint straps, two multicut parachute release straps, six D-rings, and six load binders. Restrain six, seven, or eight cargo parachutes as shown in Figures 5-25 through 5-27.

*Note.* Safety the load binders with type III nylon cord.

1. Run the first restraint strap up through the outside center carrying handles of the bottom left and top left parachutes, across the top parachutes, and down through the outside center carrying handles of the top and bottom right parachutes.

2. Run the second restraint strap up through the outside rear carrying handles of the bottom left parachute, up through the top left rear carrying handle and all bridle attaching loops of the top parachutes for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the outside rear carrying handles of the top and bottom right parachutes.

3. Run the third restraint strap through the outside front carrying handles of the left bottom and top parachutes, through the top front inside carrying handles, and down through the outside front carrying handles of the right top and bottom parachutes.

*Figure 5-25. Six Parachutes Restrained*
4 Run the six ends of the three restraint straps down through the holes in the parachute stowage platform.

5 Fit a D-ring to each end of the three restraint straps. Hook the D-ring to the clevis (indicated in the specific rigging manual) with a load binder.

6 Fold or roll all excess straps, and tie the folds to the load binders with type I, 1/4-inch cotton webbing.

7 Tie the load binders and D-rings to the stowage platform with lengths of type III nylon cord.

8 Close and safety tie the guillotine knives of two multicut parachute release straps as described earlier in this chapter.

9 Tie the release straps to the large clevis as shown earlier in this chapter.

Notes.

1. Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

2. Secure the load binders and D-rings to a convenient point on the load when there is no stowage platform.

Figure 5-25. Six Parachutes Restrained (Continued)
1. Run the first restraint strap up through the outside center carrying handles of the left bottom, middle, and top parachutes, across the top parachute, and down through the outside center carrying handles of the top, middle, and bottom right parachutes.

2. Run the second restraint strap up through the outside rear carrying handles of the left bottom, middle, and top parachutes, and both upper bridle attaching loops for the cotton bags or through the parachute restraint strap loops for the nylon bags, and down through the outside rear carrying handles of the top, middle, and bottom right parachutes.

3. Run the third restraint strap through the outside front carrying handles of the left bottom, middle, and top parachutes. Run the restraint strap across and down through the outside front carrying handles of the right top, middle, and bottom parachutes.

Figure 5-26. Seven Parachutes Restrained
4. Run the six ends of the three restraint straps down through the holes in the parachute stowage platform.

5. Secure the ends of the restraint straps as described earlier in this chapter.

6. Close and safety tie the knives and tie the release straps as described earlier in this chapter.

**Notes.**

1. Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

2. Secure the load binders and D-rings to a convenient point on the load when there is no stowage platform.

*Figure 5-26. Seven Parachutes Restrained (Continued)*
1. Run the first restraint strap up through the outside center carrying handles of the left bottom, middle, and top parachutes, across the top parachutes, and down through the outside center carrying handles of the top, middle, and bottom right parachutes.

2. Run the second restraint strap up through the outside rear carrying handles of the left bottom, middle, and top parachutes, and all upper bridle attaching loops for the cotton bags or through the parachute restraint strap loops for the nylon bags, and down through the outside rear carrying handles of the top, middle, and bottom right parachutes.

3. Run the third restraint strap through the outside front carrying handles of the left bottom, middle, and top parachutes. Run the restraint strap across and down through the outside front carrying handles of the right top, middle, and bottom parachutes.

4. Run the six ends of the three restraint straps down through the holes in the parachute stowage platform.

5. Secure the ends of the restraint straps as described earlier in this chapter.

6. Close and safety tie the knives, and tie the release strap as described earlier in this chapter.

*Note.* Place the knives around the restraint straps between the carrying handles of the outside middle and bottom parachutes.

**Figure 5-27. Eight Parachutes Restrained**
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Chapter 6
Extraction System

SECTION I-GENERAL INFORMATION

USE

6-1. The extraction system is made up of the extraction parachute, the extraction lines, line panels, and the extraction force transfer coupling (EFTC). The EFTC is bolted to the airdrop platform and is used to pull the load from the aircraft. The load exits through the cargo ramp and door of the aircraft and the extraction force is then transferred to the deployment line of the cargo parachute. The weight range of the EFTC is from 2,520 to 42,000 pounds.

COMPONENTS

6-2. The components of the EFTC used on low-velocity airdrop loads are shown in Figure 6-1.

Figure 6-1. Components of EFTC

1. Cable assembly (12-, 16-, 20-, 24-, or 28-foot)
2. Coupling link assembly
3. Latch connector assembly
4. Adapter link assembly
5. Adapter link assembly
6. Quick-release pins (pip pins)
7. Actuator assembly
8. Actuator mounting bracket
9. Locking pin
OPERATION

6-3. The EFTC is used for low-velocity airdrop and how it operates is described below.

- After the extraction parachute deploys, it pulls the extraction line and coupling link assembly or the adapter link assembly (Items 3 and 5, Figure 6-1).
- The arm of the actuator assembly (Item 7, Figure 6-1) rides on top of the aircraft’s left side restraint rail. When the load and actuator are pulled out and cleared of the rails, the arm rotates downward and pulls on the cable (Item 1, Figure 6-1) attached to the catch inside the latch assembly (Item 2, Figure 6-1). This causes the catch to release the coupling link assembly from the latch assembly.
- The extraction parachute then pulls on the deployment line and pulls on the parachute release knife, cutting the parachute restraint and starting the recovery parachute deployment.
SECTION II-RIGGING INFORMATION

EXTRACTION FORCE TRANSFER COUPLING

6-4. Inspect, maintain, and test the components of the EFTC extraction system as outlined in TM 10-1670-296-20&P/TO 13C7-49-2 and this manual.

- **Inspecting and Assembling Components.** Before each use, inspect and assemble the components of the EFTC extraction system as follows:
  - Inspect the components according to TM 10-1670-296-20&P/TO 13C7-49-2.
  - Assemble the EFTC extraction system as shown in Figures 6-2 through 6-6.

---

**CAUTION**
The compression rod spring will be under 175 pounds of pressure when the actuator is fully armed.

1. Remove the locking pin, and rotate the cover upward and rearward.

Figure 6-2. Locking Pin Removed
CAUTION
If the adjusting collar is loose, replace the cable.

Notes.
1. Before attaching the cable clevis, make sure the cable at both ends moves freely in the housing and that the cable is the proper length for the load to be rigged. This length will be cited in the specific rigging manual.

2. The EFTC is functional with all lengths of cable assemblies. When shortages of specific lengths of cable occur, the next longer cable assembly can be used.

1. Attach the clevis on the cable to the cable actuator with the straight pin and cotter pin.
2. Pull on the spring-loaded pin to release the actuator arm from the unlocked position.
3. Turn the actuator arm clockwise.
4. As the arm is turned, make sure the adjusting collar on the cable fits inside the end slot of the actuator.
5. When the actuator is armed, insert the locking pin to hold the actuator arm in place.

Figure 6-3. Cable Installed and Actuator Armed
Note. The top plate of the latch assembly is removed for clarity.

1. Use a wrench to tighten the locking nut on the cable until the nut is flush against the actuator body.

2. Make sure the adjusting collar is flush against the inside of the actuator body.

CAUTION
Do not over tighten the locking nut. This may cause the housing to crack.

Note. To ensure that the cam of the link assembly is properly seated in the latch assembly with the retainer hook holding the cam, release and then reseat the cam as follows:

3. Push up on the catch.

4. Push down on the retainer hook and idler link to free the cam, and remove the link assembly.

Figure 6-4. Cable Installed and the Link Assembly Cam Seated
Note. The top plate of the latch assembly is removed for clarity.

Reseat the cam of the link assembly in the latch assembly as follows:

1. Set the edge of the cam in place within the latch.
2. Repeat steps 3 and 4, Figure 6-4.
3. Push cam into place.
4. Push the lock link up to engage the retainer hook.
5. Align the dot on the lock link with the arrow on the catch.

Note. The cam of the link assembly is now properly seated under the retainer hook of the latch assembly.

Figure 6-5. Link Assembly Cam Reseated
Note. The top plate of the latch assembly is removed for clarity.

1. Make sure that the swage fitting end of the release cable is open 1/8 inch, and slide the fitting through the locking nut and catch spring down over the catch.

2. Align the holes in the fitting with the hole in the catch and insert the straight pin with the head up, down through the fitting. Catch and hold the pin in place with a cotter pin on the underside.

3. Use a wrench to tighten the locking nut on the cable to the threaded fitting on the latch assembly.

Figure 6-6. Latch Assembly Cable Adjusted
• **Testing EFTC Extraction System.** Before each use of the EFTC extraction system, test it as shown in Figure 6-7.

*Note.* It takes two people to test the EFTC properly.

1. The first person holds the actuator arm firmly and relaxes the binding on the locking pin. The second person removes the locking pin. The first person then allows the arm to travel to the released position.

2. The first person carefully rotates the arm fully to the lock-up position on the side of the actuator. The second person watches the inside of the latch assembly to be sure that the cable retracts the catch and that the locking link and retainer hook are released.

3. The first person closely watches the cable inside the actuator to be sure that the pull on the cable is a straight pull and that the cable does not bend or crimp.
Preparing and Attaching the EFTC to the Type V Platform. After the EFTC has been tested, disassemble it. Prepare the EFTC components and attach them to the type V platform as shown in Figures 6-8 through 6-10.

**CAUTION**
When attaching the EFTC mounting brackets on a 28- or 32-foot type V airdrop platform that has three sets of actuator mounting bracket holes, use only the rear most set of holes.

*Note.* Bolt the actuator mounting brackets to the bracket holes as directed in the specific rigging manual.

1. Bolt the inside and outside actuator brackets to the left rail of the type V platform using self locking nuts.
2. Make sure the arrow on the outside mounting bracket points toward the front of the platform to show the brackets are properly installed.

Figure 6-8. Actuator Mounting Brackets Installed to the Type V Platform Side Rail
CAUTION
When the actuator arm falls directly over the side rail bolt, use a round head replacement bolt. (NSN 5306-00-151-0653)

Step:
3. Pin the actuator to the actuator brackets with the push in, pull out (PIP) pins provided. Make sure the PIP pins are put in from the inboard side of the bracket.

4. Pass the cable to the inside of the side rail tiedown straps to prevent movement of the cable. Tie the cable in place as directed by the specific rigging manual.

Note. If a longer cable than specified in the specific rigging manual is used, make sure that it is routed in smooth S-shaped bends with no 360 degree circles.

Figure 6-9. Actuator Pinned to Brackets and Position Verified
Step:

5. Verify the positioning of the installed actuator as follows:
   • Hold the actuator arm in place, and remove the locking pin.
   
   **CAUTION**
   The actuator arm is under 175 pounds of force.
   
   • Allow the arm to rotate down through the forward indent in the side rail.
   • Make sure the arm clears the indent by 1/4-inch.
   • If the arm **CLEARS** the indent by 1/4-inch, return the arm to the armed position and replace the PIP pin.
   • If the arm **FAILS** to clear the indent by 1/4-inch, make sure the correct mounting holes were used. If the correct holes were used, REPLACE the actuator.

Figure 6-9. Actuator Pinned to Brackets and Position Verified (Continued)
Notes.

1. Ensure that the platform extraction bracket lug has the required 1/4-inch raised edge at the base of the lug. If the lug does not have a raised edge it has to be modified. This raises the latch assembly to prevent damage to the aircraft.

2. When using the modified latch connector assembly, the rounded portion must be bolted to the extraction bracket lug. If the cut portion of the latch connector assembly is bolted to the lug, it cannot rotate left or right.

1. Bolt one end of a 5 1/4-inch latch connector assembly (measured from end to end) to the extraction lug on the platform extraction bracket (Do not tighten bolt).

2. Bolt the latch assembly to the latch connector assembly (Do not tighten bolt).

3. Follow steps 3 and 4, Figure 6-4, and steps 1 through 5, Figure 6-5, to attach the coupling link assembly to the latch assembly.

4. Follow steps 1, 2, and 3, Figure 6-6, to attach the cable assembly to the latch assembly.

Notes.

1. Some EFTC configurations do not allow steps 5 and 6. See specific rigging manuals for procedures.

2. When installing the EFTC, the latch assembly is rotated to the right and left. On some airdrop loads the specified cable length in the rigging procedures is not long enough to allow the latch assembly to contact the platform, when rotating it to the right. Airdrop units are authorized to use the next longer length of EFTC cable if the latch assembly fails to make contact with the platform while installing the EFTC.

5. After attaching the cable, rotate the latch assembly all the way right until it comes in contact with the platform or lug, then all the way to the left until the cable begins to bind.

Figure 6-10. Latch Assembly Bolted to Type V Platform Extraction Bracket
CAUTION

Tie the slack in the cable in a smooth S-shaped bend. This should be tied to the side of the load or to a lashing on the type V platform in such a way to allow free play in the cable. This will avoid binding problems in the cable. Do not make a tie around the metal reinforced portion of the EFTC cable.

6 With the latch assembly in the far right position, make the securing ties to the cable using Type I, 1/4-inch cotton webbing, one turn single with a surgeon’s knot and locking knot allowing free play in the cable. (Not Shown)

7 Rotate the latch assembly left and right once again to verify sufficient play. The cable SHALL NOT bind. Ensure that dot/arrow on the latch assembly stays aligned.

8 Repeat step 7 with the latch assembly in the transportation (vertical) position.

9 Tighten bolts from steps 1 and 2.

10 Bolt one end of the deployment line to the right spacer of the coupling link assembly.

11 When a 6-loop extraction line is used, the adapter link assembly MUST be used to separate the loops of the line.

Note. After you verify sufficient slack in the cable on the EFTC, remove the quick-release pins from the actuator. Lay the actuator on the platform, and secure the actuator. This will keep the actuator from being damaged while the platform is being loaded in the aircraft.
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Chapter 7
Extraction Parachute Jettison System (EPJS)

SECTION I-GENERAL INFORMATION

USE

7-1. The EPJS allows jettisoning of an extraction parachute, extraction line and line panel in the event of a malfunction during the extraction phase of airdrop. The system is capable of jettisoning a single 15, 22, or 28-foot extraction parachute.

CAUTION

The load range of the EPJS is 2,520 pounds to 30,000 pounds. The EPJS is not authorized for use with clusters of two 28-foot extraction parachutes.

DESCRIPTION

7-2. The EPJS consists of four extraction parachute jettison devices (EPJDs) and the aircraft electrical control components that accommodate four airdrop loads. The EPJD connects directly to the airdrop load and the EPJS aircraft electrical components are routed and secured inside the cargo compartment of the aircraft. Modifications to existing hardware are not required. The EPJD is prepared and attached to an extraction line prior to loading the aircraft. The aircraft electrical control components will be installed in the aircraft by the aircrew prior to aircraft loading. The aircrew will attach the EPJD to the platform after the platform is locked into position on the aircraft. The EPJS may be utilized with the C-17 and the C-130 aircraft. Figure 7-1 shows the location of the major components.
Note. One load is shown and the EPJD with attached components is expanded for clarity. For a complete component listing, refer to TM 10-1670-296-20&P/TO 13C-7-49-2.

1 Extraction Parachute Jettison Device
2 Squib Cable, 18-inch (yellow)
3 Safety Cap (stowed in EPJD)
4 Protective Cover
5 Platform Cable, 10-foot (yellow)
6 Y-Connector Mounting Box (C-130; C-17)
7 Y-Connector

Figure 7-1. Major Components of the Extraction Parachute Jettison System
INSPECTION AND MAINTENANCE

7-3. The EPJS components are inspected and maintained according to the procedures in TM 10-1670-296-20&P/TO 13C7-49-2. See the TM for specifics on inspection and maintenance procedures.

OPERATION

7-4. The operation of the EPJS is explained in Figure 7-2.

- Normal Airdrop Sequence. During a normal airdrop, there is no change to the existing sequence of extraction and deployment events. Cable disconnect events occur in the following manner. As the airdrop platform moves aft from its locked position during extraction, the forward connector of the platform cable disconnects from its respective Y-connector. During extraction transfer, the squib cable disconnects from the aft connector of the platform cable.

- Extraction Malfunction. When the "JETTISON" switch is activated the EPJD releases the keeper, allowing the extraction line and keeper to pull free of the load and aircraft. If multiple loads are being airdropped and the jettison switch is activated, all squibs will fire simultaneously.
1 The EPJS operates when the jettison switch of the EPJS control box is moved to the "JETTISON" position.

2 Squib: The squib will then fire, generating a tremendous amount of force.

3 Piston: The force will push on the piston inside the housing.

4 Latch: The piston will push against the latch.

5 Shear Bolt: The latch in turn, applies sufficient tension to break the shear bolt.

6 Keeper: The latch then rotates aft, releasing the extraction line keeper and the attached extraction line, line panel and extraction parachute.

Figure 7-2. Operation of the Extraction Parachute Jettison System (EPJS)
SECTION II-RIGGING INFORMATION

PREPARING THE EPJS

7-5. Inspect, test, and prepare the components of the EPJS as shown in TM 10-1670-296-20&P/TO 13C7-49-2 and this manual.

- Preparing the Extraction Parachute Jettison Device (EPJD). Before each use, inspect and assemble the components of the EPJD as shown in TM 10-1670-296-20&P/TO 13C7-49-2.
- Attaching the Extraction Line. Prepare and attach the extraction line to the EPJD as shown in Figure 7-3.

WARNING

The squib must not be installed in the EPJD when beginning this procedure. A squib, when improperly handled, may inadvertently activate, or fail to activate when required. Unintentional activation may result and cause injury to personnel, burns or unwanted secondary activations.

CAUTION

Ensure that the piston stop and cross hole plug is installed in the EPJD, and that the shear bolt is not loose. Do not unscrew the latch retainer nut from the latch.
1. Remove the cap screws and retainer clamp from the latch of the EPJD.
2. Unscrew the latch retainer from the shear bolt.
3. Remove the extraction line keeper from the latch.
4. Girth hitch an 18-inch piece of type I, 1/4-inch cotton webbing through the rectangular portion of the keeper.

**Figure 7-3. Extraction Line Attached to the EPJD**
5. Evenly split the plies of the extraction line and place the keeper inside.

6. Route the running ends of the type I, 1/4-inch cotton webbing around the top of the extraction line in opposite directions and secure it with a surgeon’s knot and locking knot.

7. Place the extraction line keeper with extraction line attached back into the latch of the EPJD.

8. Secure the latch by screwing the latch retainer nut to the shear bolt (not shown).

**Note.** Lift the latch slightly before engaging the threads to make assembly easier.

9. Attach the retainer clamp to the latch using the two cap screws.

**Note.** Ensure the cap screws are wrench tightened using a 5/32-inch T-handle, hex drive wrench.

Figure 7-3. Extraction Line Attached to the EPJD (Continued)
• **Attaching the Protective Cover to the EPJD.** Attach the protective cover to the EPJD and extraction line as shown in Figure 7-4.

1. Cut a piece of type III nylon cord 60 inches long. Lace the two running ends of the type III nylon cord through the two inside grommets of the protective cover from nylon side to felt side. Position the protective cover on the EPJD, felt side down, with the grommet edge toward the extraction line panel.

2. Route the two running ends of the type III nylon cord to the outside of the extraction line and through the rectangular cutout in the extraction line keeper from top to bottom.

3. Run the two running ends of the type III nylon cord to the two outside grommets of the cover from felt side to nylon side (only the left outside grommet is visible in photo).

4. Align the edge binding of the cover with the front edge of the EPJD latch.

5. Fold the protective cover around the EPJD and secure the hook pile tape.

6. Tighten the type III nylon cord making sure the cover does not slip forward over the EPJD attaching lug. Cross both running ends and bring them to the top of the cover. Tie the running ends in a surgeon’s knot and locking knot with overhand knots in the running ends.

---

**Figure 7-4. Protective Cover Attached to the EPJD**
• **Attaching the Squib to the EPJD.** Attach the squib to the EPJD as shown in Figure 7-5.

![WARNING Image]

**WARNING**

When attaching the squib to the EPJD do not separate the squib cable with safety cap from the squib.

1. Inspect and prepare a squib, squib cable with safety cap and EPJD according to the procedures in TM 10-1670-296-20&P/TO 13C7-49-2 and Figures 7-3 and 7-4 of this manual.

2. Apply a small amount of O-ring lube to the O-ring of the squib.

3. Attach the squib assembly to the threaded EPJD squib port. Use a 1-inch wrench provided with the kit to tighten the squib until it contacts the body of the EPJD.

**Note.** Do not over tighten the squib.

---

![Figure 7-5 Image]

**Figure 7-5. Squib and Squib Cable Attached to the EPJD**
WARNING

Avoid handling the EPJD by its latch after the squib has been installed in the EPJD squib port.

4 Open the hook pile tape and bend the squib cable back so that the connector and most of the cable is inside the protective cover and close the cover.

Figure 7-5. Squib and Squib Cable Attached to the EPJD (Continued)
• **Preparing the Airdrop Load.** Prepare the airdrop load by attaching a platform cable to the load as shown in Figure 7-6.

1. Inspect a 10-foot platform cable as shown in TM 10-1670-296-20&P/TO 13C7-49-2.

2. Girth-hitch a 32-inch length of type III nylon cord to a point just forward of the aft connector flange of the platform cable. Position the girth-hitched portion of the cable on top of the right side of the extraction bracket, aligning the tie with the rear edge of the platform.

3. Route both running ends of the type III nylon cord through the space between the top of the extraction bracket and the extraction lug in opposite directions.

**Figure 7-6. Platform Cable Attached to the Airdrop Load**
4 Route and secure the running ends of the type III nylon cord on top of the platform cable with a surgeon’s knot and locking knot with overhand knots in the running ends.

5 Route the platform cable to the right side of the platform and behind all lashings and slings.

6 Girth-hitch two suitable lengths of type III nylon cord to the quick disconnect fitting on the platform cable to be used as safety ties during after-load rigging.

**Note.** When utilizing the C-17 aircraft an extension cable must be used; therefore; girth-hitch a single length of type III nylon cord around the quick disconnect fitting of the platform cable.

7 Tie the platform cable to a convenient point on the load with a length of type I, 1/4-inch cotton webbing.

**Figure 7-6. Platform Cable Attached to the Airdrop Load (Continued)**
Preparing the EPJS Aircraft Components for Transportation (C-130, and C-17 only). Assemble, inspect, and transport the EPJS aircraft components as follows:

- Inspect a set of EPJS aircraft components as outlined in TM 10-1670-296-20&P/TO 13C7-49-2.
- Stow the components of the EPJS in an EPJS equipment bag. Put the control box and mounted Y-connectors in the lower level compartments. Fold the separator panel over the lower level and place the cables in the upper level.

Note. Ensure that the Y-connectors are mounted to the Y-connector mounting boxes according to the type of aircraft being utilized. For the C-130 and C-17 aircraft, mount the Y-connector to the wide portion of the mounting box.

- Transport an EPJD with extraction line attached, that has been prepared as outlined in Figures 7-3 through 7-5 of this manual.
- While the airdrop loads are being weighed and manifested, transport the EPJS equipment bag and the prepared EPJD to the aircraft.
- Aircrew members will install the EPJS in the aircraft.

Attaching the EPJD to the Airdrop Load During After-Load. Attach the EPJD to the load as shown in Figure 7-7.

WARNING

Failure to connect the squib cable to the platform cable as soon as practical after removing the safety cap, increases the probability of inadvertent activation.

CAUTION

Ensure the safety cap is stowed in the threaded port of the EPJD.
Note. Ensure that the spacer removed in step 1 is removed from the aircraft prior to airdrop.

1. Remove the nut, bolt, and spacer from the extraction side of the coupling assembly. Attach an EPJD that has been inspected and prepared according to the procedures in TM 10-1670-296-20&P/TO 13C7-49-2 and Figures 7-3 through 7-5. Secure with the nut and bolt previously removed.

2. Route the squib cable through the hole in the top plate of the coupling assembly.

WARNING
Prior to attaching the squib cable to the platform cable ensure the power and jettison switches on the control box are in the off position. This will prevent inadvertent activation of the squib.

3. Remove the safety cap from the squib cable and immediately plug the connector on the squib cable to the fitting on the platform cable.

4. Stow the safety cap in the threaded hole on the left side of the EPJD body.

5. Route a length of type III nylon cord around the squib cable and top plate of the coupling assembly on the deployment side making a loose retaining tie. Secure with a surgeon's knot and locking knot with overhand knots in the running ends.

Note. When making the retaining tie ensure that there is approximately 1 to 3 inches of slack between the top plate of the three-point link and squib cable.

Figure 7-7. EPJD Attached to the Airdrop Load
Chapter 8
Release Assemblies

SECTION I-GENERAL INFORMATION

USE

8-1. The cargo parachute release assembly allows the parachute(s) to separate from the load when the load touches the ground. The separation reduces the chance of the wind dragging or overturning the load.

DESCRIPTION

8-2. The M-1 or the M-2 is used when a platform load is rigged for low-velocity airdrop. The automatic cargo release is used on some Marine Corps, Navy and Air Force loads.

- **The M-1 Airdrop Cargo Parachute Release.** This release is used with rigged loads weighing up to 15,000 pounds suspended.

- **The M-2 Airdrop Cargo Parachute Release.** The M-2 release is similar to the M-1 release. The M-2 release is used on loads weighing up to 42,000 pounds suspended.

- **The Automatic Cargo Parachute Release (ACPR) (Not for Army Use).** The automatic cargo parachute release is a two-piece unit that operates on a load-tension activated hydraulic arming delay principal. It has no internal maintenance or repair. The automatic cargo parachute release is used on loads weighing up to 2,500 pounds suspended.

*Note.* Specific rigging manuals will specify which release is used.

INSPECTION AND MAINTENANCE

8-3. The M-1 and M-2 releases are inspected and maintained as outlined in TM 10-1670-296-20&P/TO 13C7-49-2. See the TM for specifics on inspection and maintenance.

OPERATION

8-4. The operation of the airdrop cargo parachute release works when the load touches the ground and upper suspension link tilts or moves to the side. When the release tilts, the parachutes are released from the load. Figure 8-1 shows how the release operates.
Note. The face plate has been removed to aid in identification.

1. As the cargo parachute deploys, the arming wire lanyard is pulled.
2. The safety tie is broken and the arming wire is pulled from the timer.
3. The timer delays from 12 to 16 seconds. This delay allows the load to stabilize itself under the parachute.
4. When the timer winds down, it retracts its keys from the slots in the release.
5. When the keys are retracted from their slots, the timer is free to fall within the release.
6. As the timer falls, it frees the toggle and upper suspension link.

Figure 8-1. Typical Operation of the M-1 and M-2 Cargo Parachute Release
7 When the load descends, the normal upright position of the M-1 release keeps the parachute connectors in place. As the load touches the ground, the upper suspension link tilts and allows the parachute connectors to pull free.

8 The released parachute stretches the dragline until the release drags to one side of the load to prevent damage to the load. Then the dragline breaks.

Figure 8-1. Typical Operation of the M-1 and M-2 Cargo Parachute Release (Continued)
SECTION II-RIGGING INFORMATION

M-1 CARGO PARACHUTE RELEASE

8-5. Test, attach, and safety the M-1 cargo parachute release as follows:

CAUTION
DO NOT use the M-1 cargo parachute release with four G-11B cargo parachutes. The M-2 cargo parachute release MUST be used.

• Testing Timer. Before each use, seat, arm, and test the delay timer as shown in Figures 8-2 through 8-4.

1 Align and center the upper suspension link with the release side plates.

CAUTION
If the timer is not correctly seated in the upper position in the release when it is armed, the keys will not fit into the slots in the back side plate and could damage the timer.

2 Reach between the side plates, and slide the timer up until the toggles fit in the toggle lock slides, making sure the timer slides freely. You should be able to see the winding shaft of the timer through the guide block winder access hole.

Figure 8-2. Delay Release Timer Seated
1. Put the tip of a flat-tip screwdriver through the guide block winder access hole and into the slot in the timer winding shaft. Gently turn the shaft one-quarter turn to the right and stop, holding the shaft with the screwdriver.

**Note.** If the winding shaft is hard to turn, hold the shaft with the screwdriver and move the timer around until the keys align with the slots in the back plate.

2. Hold the shaft, and push the arming wire down through the hole in the guide block and the hole in the winding shaft.

**Note.** When the timer is correctly armed, about 1/2 inch of the arming wire can be seen through the slot below the guide block winder access hole.

**Figure 8-3. Timer Armed**
Note. The delay release timer will be tested before each use.

Pass a length of type I, 1/4-inch cotton webbing up between the release side plates, over and around the center of the timer, and back down between the side plates. The side plate and a toggle lock slide have been removed to show how the webbing passes around the timer. You may use a length of wire to help you pass the webbing around the timer.

Figure 8-4. Testing Timer
CAUTION
Do not over tighten the face side plate. Failure to do so could result in a malfunction of the M-1 release.

Figure 8-4. Testing Timer (Continued)

2. Hang the release in a straight, level position.

3. Tie a 10-ounce weight, such as a platform clevis with bolt with no spacer or a parachute release connector, without the nut and bolt, to the type I, 1/4-inch cotton webbing.

4. Pull the arming wire from the timer. Count the seconds from the time the wire is pulled until the timer falls within the release.

Note. If the timer fails to fall after the allotted time (12 to 16 seconds), refer to TM 10-1670-296-20&P/TO 13C7-49-2 for proper maintenance procedures.
• **Preparing, Attaching, and Safety Tieing Release.** Prepare, attach, and safety the M-1 cargo parachute release as shown in Figures 8-5 through 8-7.

**NEW PARACHUTE CONNECTOR**

**ONE PIVOT POINT**

**OLD PARACHUTE CONNECTOR**

**TWO PIVOT POINTS**

**PARACHUTE CONNECTOR**

**Figure 8-5. Parachute Connector Fitted to Upper Suspension Link or M-1 Release**

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**Note.** Do not mix the two types of connectors on the same release.

1. Use an M-1 release with a tested timer and make sure that the delay release timer is down in the housing of the release.

2. Move the upper suspension link to the right or the left as far as it will go.

3. Open the arms of a parachute connector, and fit the arms on the upper suspension link with the tips together in the groove of the retaining clamp.

**Notes.**

1. One parachute connector will be fitted to the upper suspension link for each cargo parachute used on the load.

2. A retaining band may be used to aid in assembly.

3. Fit a retainer band around the parachute connector to aid in assembly. Remove the retainer bands.
1. Move the upper suspension link back to the center of the release and arm the timer as indicated in Figures 8-2 and 8-3.

2. Safety the arming wire lanyard to the upper suspension link with a double length of type I, 1/4-inch cotton webbing with a surgeon’s knot and a locking knot.

---

**CAUTION**

The end loop of the arming wire may pull free from the crimping sleeve during parachute deployment. To ensure that the arming wire disengages from the timer stem, an arming wire safety tie must be installed on all arming wires prior to use on an airdrop operation.

---

*Figure 8-6. M-1 Release Prepared*
Note. With the arming wire lanyard attached to the arming wire loop, the arming wire loop shall be designated as the top. This safety tie should be inspected at the joint airdrop load inspection, before and after loading. Install the safety tie as follows:

3. Girth hitch a 12-inch length of 1/4-inch cotton webbing on the safety wire just below the metal fastener.

4. Route one running end of the 1/4-inch cotton webbing through the looped ends of the arming wire and lanyard.

5. After ensuring there is 1/2-inch to 1-inch of slack in both running ends, tie a surgeon’s knot and locking knot in the 1/4-inch cotton webbing.

6. Fold the slack in the lanyard, and tape the folds in place with one turn of masking tape.

7. Fold the slack in the lanyard, between the safety tie and the arming wire, and tape the fold to the face side plate with one piece of masking tape.

Note. Include the following data on the masking tape: name, date, and timer seconds.

8. Tie one end of a 5-foot length of type III nylon cord (dragline) to the outside side of the right lower suspension link.

9. Tie the other end of the dragline to the body of the right parachute release connector.

10. Fold the slack in the dragline and tape the folds in place with one turn of masking tape.

Figure 8-6. M-1 Release Prepared (Continued)
**CAUTION**

Make sure the arming wire lanyard is routed over all items.

1. Put the release on the load as instructed in the specific rigging manual for the load.

**Note.** Bolt a 3-foot (2-loop), type XXVI nylon sling to the parachute clevis of one G-11B cargo parachute and to the parachute connector fitted to the release.

2. Bolt the riser extensions of two G-12E, or two or three G-11B cargo parachutes to the parachute connectors already fitted to the release.

3. Attach the front suspension slings to the top bolts of the lower suspension link.

4. Attach the rear suspension slings to the lower bolts of the lower suspension link. The rear slings will have a half twist towards the parachutes.

5. Run a length of type III nylon cord to encircle the lower spacer, and tie the ends of the cord to points on the front of the load or platform.

6. Run a length of type III nylon cord over the suspension slings and through the parachute connectors, and tie the ends of the cord to points on the rear of the load or platform.

7. Tie the lanyard to a carrying handle of a parachute with three alternating half hitches and an overhand knot in the running end.

8. Fold the slack in the lanyard, and tape the folds in place with one turn of masking tape. (Not shown)

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**Figure 8-7. M-1 Release Attached and Safety Tied to Load**
M-2 CARGO PARACHUTE RELEASE

8-6. Prepare, attach, and safety the M-2 cargo parachute release as follows:

- **Preparing Release.** Test the timer and prepare an M-2 cargo parachute release the same as the M-1 release.

  *Note.* Three to eight connectors may be fitted to an M-2 release. The M-2 release requires a 5-foot dragline made from 1/2-inch tubular nylon webbing.

- ** Attaching and Safety Tying Release.** Attach and safety tie the M-2 cargo parachute release to the load as shown in Figure 8-8.

  *Note.* When using the M-2 cargo parachute release on the 28-foot and 32-foot platforms, use a 25-foot arming wire lanyard. Make the lanyard according to TM 10-1670-296-20&P/TO 13C7-49-2.

---

1. Form a girth hitch around one side of a suspension sling keeper with a 5-foot length of 1/2-inch tubular nylon webbing. Make sure the running ends are equal.

2. Route both ends around the looped end of the sling and through the lower suspension link.

3. Route one end of the 1/2-inch tubular nylon webbing through the suspension sling keeper.

4. Slide the keeper as close to the lower suspension link as possible. Tie the running ends together with a slip knot.

---

**Figure 8-8. M-2 Release Prepared, Attached, and Safety Tied to Load**
5. Put the release on the load as instructed in the specific rigging manual for the load.

6. Bolt the riser extensions of three to four G-11B or five to eight G-11C cargo parachutes to the parachute connectors already fitted to the release.

7. Attach the front suspension slings to the top bolt of the lower suspension link.

8. Attach the rear suspension slings to the lower bolt of the lower suspension link. The rear slings will have a half twist towards the parachutes.

9. Run a length of type III nylon cord through the connectors, and tie the ends of the cord to points on the rear of the load or platform.

10. Run a length of type III nylon cord around the lower spacer, and tie the ends of the cord to points on the front of the load or platform.

11. Tie the lanyard to the carrying handle of a parachute with three alternating half hitches and an overhand knot in the running end.

12. Fold the slack in the lanyard, and tape the folds in place with one turn of masking tape.

13. Install the drag line and fold the slack. Secure with masking tape.

Figure 8-8. M-2 Release Prepared, Attached, and Safety Tied to Load (Continued)
THE AUTOMATIC CARGO PARACHUTE RELEASE (NOT FOR ARMY USE)

8-7. The automatic cargo parachute release is a two-piece unit that operates on a load tension activated hydraulic arming delay principle. It has no internal maintenance or repair.

Note. The service life of the release is 10 years from the date of manufacture.

- **Physical and Functional Characteristics.** The physical and functional characteristics of the automatic cargo release are shown in Figure 8-9.

![Figure 8-9. Physical and Functional Characteristics](image)

1. The automatic cargo release is a two-piece unit that operates on a load-tension activated hydraulic arming delay principle. The main body, section 1, is attached to the main parachute riser and the release fitting shackle.

2. The release fitting shackle is attached to the suspension sling while the assembly is in the closed position.

3. Application of a load will exert force on the piston rod.

4. This causes the piston head to move downward.

5. This also causes the load spring to move downward.

6. This forces hydraulic fluid, located in the lower chamber to flow through orifices in the piston head.

7. The fluid flows from the piston head to the upper chamber.

8. The size of the orifices and the thickness of the fluid limit the flow, so that the maximum stroke will occur after a period of time defined by the manufacturer as $420 / \sqrt{\text{load in pounds}}$. At the end of the stroke, the jaws are fully extended downward.

9. The jaw teeth engage the neck and shoulders of the release stud, in the shackle and retain it by friction as long as the load remains on the assembly.

10. When the load is relieved due to canopy collapse, the release spring forces the jaws apart and the release fitting shackle drops away.
- **Original Receipt Inspection.** After removing the unit from its packaging, visually verify that all components of Figure 8-9 are present and in acceptable condition for use (no corrosion, deformation, leakage, or other abnormalities). Perform a pre-drop activation test as shown in Figure 8-10.

**Note.** When testing the Automatic Cargo Parachute Release the main body must be facing up.

**Step:**

1. Remove the two hex bolts and spacers and insert the spacers into interfacing webbing loops.

2. Attach the main body section webbing sling to a hoist or any suitable support that allows sufficient height to activate the release. (Full extension including release mode is 2 inches.)

3. Attach a weight of approximately 200 pounds to the release fitting shackle webbing sling. If the support height is sufficient, your suspended body weight is suitable.

**Figure 8-10. Pre-Drop Activation Test**
Step:

4. Time the arming delay starting from when the load is applied to when the jaws of the release extend below the cutouts in the bottom section of the main body section. Release mode should occur after 30 to 40 seconds under a 200-pound load. If the release mode and full extension is reached in less than 30 seconds under a suspended load of 200 pounds, the release is to be considered unserviceable.

Figure 8-10. Pre-Drop Activation Test (Continued)
CAUTION

Ensure the release fitting shackle is held when the weight is released to prevent it falling upon separation which could cause personal injury.

Step:

5. When the release mode has been achieved, simulate impact by lowering the hoist (if used) until the load is relieved; or if body weight is used, (ensure the release fitting shackle is held securely to prevent personal injury upon separation), quickly release the load. The spring loaded jaws will kick outward releasing the release fitting shackle which allows the cargo release unit to immediately separate. The outer lip on the jaws will catch on the lip of the main body section, holding the piston extracted and retaining the jaws in the open position.

Figure 8-10. Pre-Drop Activation Test (Continued)
Step:

6. Inspect the main body section for fluid leakage. The jaws and release fitting shackle should be totally dry. The silicone fluid is clear and if any evidence of leakage is apparent, it will appear as wet and glistening. If leakage is evident, the release will not be used.

Note. The automatic cargo parachute release NSN 1670-01-337-4366 part number 811-00220 incorporates a removable filter. The automatic cargo parachute release part number 811-00220-1/-2 incorporates a nonremovable solid aluminum cap.

7. Inspect the presence, condition, and security of the removable filter. The filter is a thin silver disc of porous metal located on the end of the main body section. The removable filter is held securely in the main body piston cavity by a washer and retaining ring.

8. Inspect for presence, condition, and security of the solid aluminum cap. The cap is located on the end of the main body section.

9. Preparation for reuse is accomplished by simply flushing foreign particles from the unit and air drying.

Figure 8-10. Pre-Drop Activation Test (Continued)
Step:

10. If the spring loaded jaws are squeezed together without the release fitting shackle installed, they will retract into the main body section. When this occurs, simply insert a 1/4-inch diameter (thread size 20) eye bolt into the threaded hole of the piston. Attach the release body to a hoist or suitable support, and attach a weight to the eye bolt. When the jaws are extracted beyond the body, they will be forced to the open position by the spring tension.

11. Insert the release fitting shackle in the main body section by inserting the pins in the respective holes in the piston. Hold in position, and by using finger pressure, squeeze the spring loaded jaws together. Retraction of the jaws into the main body section will immediately start. (The check valve within the hydraulic circuit allows quick and easy insertion.) Completely close the release assembly using hand force. The cargo release is now ready for use.

12. The release should always be reassembled and stored in the closed position. After submersion in water, position the release with the filter end facing down, allowing any water which may be trapped behind the filter to drain.

Figure 8-10. Pre-Drop Activation Test (Continued)
**Installation for Airdrop.** Instructions for installing the cargo release are shown in Figure 8-11.

**Step:**

1. Perform the pre-drop activation test to ensure the cargo release is fully functional and ready to use.

2. Ensure the release is used with a 3-foot sling attached to the main body section and to the release fitting shackle. (The slings will absorb any twisting during parachute descent.)

3. Install the cargo release with the main body section facing toward the parachute riser and the release fitting shackle facing toward the cargo load slings.

4. Tie the cargo release to the rigged load in two places by routing a length of 1/4-inch cotton webbing through each end shackle sling.

*Figure 8-11. Cargo Release Installed*
- **Post Drop Maintenance.** Perform post drop maintenance according to the following:

**Step:**

1. Remove the retaining ring in the upper cargo release assembly using Truarc ring pliers. To remove the filter and washer, hold the release filter end downward. The filter and washer should fall out. Thoroughly rinse the main body section and release fitting shackle with fresh water. Direct flow using a water hose or faucet would be ideal. If the cargo release has not been maintained, the filter may adhere to the housing bore. Where severe corrosion exists, the filter may have to be replaced.

2. Thoroughly rinse the main body section and release fitting shackle with fresh water. (For non-removable solid aluminum cap)

3. Inspect the cargo release visually for obvious damage. Use low pressure air if available to dry the unit. Minor leakage of the silicone fluid will be very difficult to detect at this point.

**Note.** The release fitting shackle assembly, part number 811-00324-1, NSN 4030-01-353-6217, may be procured through normal supply channels.

4. Reassemble the unit by inserting the release fitting shackle into the main body section and squeezing the spring loaded jaws together. Completely close the release assembly using hand pressure. If the release does not close fully and the ball locks cannot snap in place, then the unit should be subjected to the pre-drop inspection test.

5. To completely dry, hang or stand the assembled unit with the filter end (main body section) facing down to allow drainage of any water that may have accumulated behind the filter.

6. Any discrepancies found or suspected will be cause for rejection. Return the unit with a brief description of the problem and a point of contact to: Commander, Code 461100D, Naval Air Warfare Center Weapons Division, 1 Administration Circle, China Lake, CA 93555-6001. Do not return the unit to the manufacturer.
PARACHUTE RISERS ATTACHED TO THE PARACHUTE RELEASE

8-8. Lay the parachute release on top of the load with the bolt end of the parachute connectors toward the cargo parachutes. Bolt the parachute riser extensions to the parachute connectors of the M-1 or M-2 parachute releases as shown in Figures 8-12 through 8-15.

*Note.* Bolt the parachute riser extensions to the parachute connectors from rigger’s right to left.

![Diagram of parachute risers attached to parachute release](image)

Figure 8-12. Three and Four Parachute Riser Extensions Attached to the Parachute
Figure 8-13. Five Parachute Riser Extensions Attached to the Parachute

Note. Only used on small emplacement excavator (SEE)
Figure 8-14. Six and Seven Parachute Riser Extensions Attached to the Parachute
Figure 8-15. Eight Parachute Riser Extensions Attached to the Parachute
Chapter 9

Drogue and Extraction Parachutes and Extraction Line

SECTION I-GENERAL INFORMATION

DROGUE PARACHUTES

9-1. A 15-foot cargo extraction parachute is used as a drogue parachute attached to a 1-loop, 60-foot type XXVI extraction line with a 3 3/4-inch link for the C-130J, MC-130, and the C-17 aircraft. The opposite end of the drogue line is connected to the jettison link of the extraction link assembly.

CARGO EXTRACTION PARACHUTES

9-2. A cargo extraction parachute is placed on every airdrop platform load to pull the load out of the aircraft. The extraction system is rigged up after the load is in the aircraft.

- **The 15-Foot Parachute.** This extraction parachute has a 15-foot-diameter, flat circular ring-slot nylon canopy. It is also used as a drogue parachute.
- **The 22-Foot Parachute.** This extraction parachute has a 22-foot-diameter, flat circular ring-slot nylon canopy.
- **The 28-Foot Parachute.** This extraction parachute has a 28-foot-diameter, flat circular, ring-slot nylon canopy.

INSPECTION, MAINTENANCE, AND PACKING

9-3. Cargo extraction parachutes are inspected, maintained, and packed as outlined in TM 10-1670/TO 13C5 series manuals. See the specific TM for more information on inspecting, maintaining, and packing these parachutes. The 22-foot extraction deployment bag modification procedures are located in TM 10-1670-286-20/TO 13C5-2-41.

REQUIREMENTS

9-4. Each rigging manual states the number and type of cargo extraction parachutes and the extraction line to be used on a particular load. However, when changes are made to an accompanying load or variations in rigging are made, the extraction parachute requirement must be determined. Use Table 9-1 as a guide for determining the cargo extraction parachute. Use Table 9-2 as a guide for determining extraction line requirements and the extraction parachutes link and tie requirements for the C-130 and C-17 aircraft.
### Table 9-1. Extraction Parachute Requirements for C-130 Series and C-17 Aircraft

<table>
<thead>
<tr>
<th>Extraction Load Range</th>
<th>Cargo Extraction Parachute</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,520-8,000</td>
<td>15-Foot</td>
</tr>
<tr>
<td>7,000-17,000</td>
<td>22-Foot</td>
</tr>
<tr>
<td>16,000-30,000</td>
<td>28-Foot</td>
</tr>
<tr>
<td>28,000-42,000</td>
<td>Two 28-Foot</td>
</tr>
</tbody>
</table>

**Notes.**

1. The maximum load that may be extracted over the ramp of a C-130 aircraft during airdrop is 25,000 pounds for aircraft with a serial number (tail number) of 62-1783 or lower and 42,000 pounds for aircraft with a tail number of 61-2358, 62-1784 and higher.

2. When the extraction weight falls into the load range of two parachutes, the larger extraction parachute should be used.

3. The minimum total rigged weight (includes the weight of the cargo parachutes) for loads to be airdropped from all aircraft is 2,520 pounds.

4. MC-130 aircraft extracted load range shall not exceed 35,000 pounds.
Table 9-2. Extraction Line and Link and Tie Requirements for C-130 Series, and C-17 Aircraft

<table>
<thead>
<tr>
<th>Extraction Parachute</th>
<th>C-130</th>
<th>C-17</th>
<th>Link</th>
<th>Tie</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-Foot</td>
<td>1-Loop 60-Foot</td>
<td>1 Loop 160 Foot</td>
<td>3 ¾-inch, two-point</td>
<td>1 turn single of type I, ¼-inch cotton webbing</td>
</tr>
<tr>
<td>22-Foot</td>
<td>3-Loop 60-Foot</td>
<td>3 Loop 140 Foot</td>
<td>3 ¾-inch, two-point</td>
<td>1 turn single of type I, ¼-inch cotton webbing</td>
</tr>
<tr>
<td>28-Foot</td>
<td>3-Loop 60-Foot</td>
<td>3 Loop 140 Foot</td>
<td>5 1/2-inch, two-point</td>
<td>1 turn double of type I, ¼-inch cotton webbing</td>
</tr>
<tr>
<td>Two 28-Foot</td>
<td>6-Loop 60-Foot</td>
<td>6 Loop 120 Foot</td>
<td>Four point</td>
<td>1 turn single of type III, nylon cord</td>
</tr>
<tr>
<td>Two 28-Foot</td>
<td>N/A</td>
<td>6 Loop 140 Foot</td>
<td>Four point</td>
<td>1 turn single of type III, nylon cord</td>
</tr>
</tbody>
</table>

Notes.

1. All extraction lines, (except for the C-17 drogue line) must be packed in an extraction line bag according to TM 10-1670-286-20/TO 13C5-2-41.

2. A 120-foot extraction line may be used for loads placed no further forward than fuselage station 680 (C-17 only).

3. All extraction lines are type XXVI nylon webbing.
EXTRACTION LINE PANEL

9-5. The extraction line panel, as shown in Figures 9-1 and 9-2, is used to store the extraction lines. Extraction line panels shown in Figure 9-3 are used to store the extraction lines when used in conjunction with towplate operations. Stow the different extraction lines in the extraction line bag according to TM 10-1670-286-20/TO 13C5-2-41.

Figure 9-1. Outside View of Extraction Line Panel
Figure 9-2. Inside View of Extraction Line Panel
Figure 9-3. Extraction Line Panel for Tow Plate Operations
SECTION II-RIGGING INFORMATION

EXTRACTION LINES

9-6. The size and length of the extraction line used depends on the aircraft used and the size of the cargo extraction parachute rigged for the load.

CAUTION
All multi-loop lines must have 15 feet of each end of the line, taped at 1 foot intervals. The measurement should begin from the end of the line and the tape must be centered at each interval mark. Failure to comply may cause an extraction line ply to get caught under the aircraft roller and cause damage to the roller or extraction line.

CAUTION
While attaching the extraction line to the cargo extraction parachute, ensure that the keepers on the extraction line and the adapter web are pushed tight against the link and are taped in place with cloth-backed tape. If a keeper is not present on the adapter web or extraction line, tape in place with cloth-backed tape.

C-130/MC-130 AIRCRAFT

9-7. The primary method of airdrop platform extractions uses a 60-foot extraction line attached to a cargo extraction parachute as detailed in the following paragraphs.

- **One 15-Foot Cargo Extraction Parachute.** Attach a 60-foot (1-loop), type XXVI nylon webbing extraction line as shown in Figure 9-4. Attach the adapter web of the 15-foot extraction parachute as shown in Figure 9-4.
1. Fit the loop of the adapter web on the spacer of a 3 3/4-inch, 2-point link assembly.

2. Fit the extraction line attaching loop to the other spacer on the link. Replace the side plate of the link assembly. Put the nuts on the bolts of the 2-point link. Use a wrench to tighten the nuts. Run a length of tape around the link and over each nut and bolt end. Tape the keeper and the adapter web in place with cloth backed tape. (Not shown)

3. Tie the 3 3/4-inch, 2-point link tightly against the parachute bag closing loops with one length of type I, 1/4-inch cotton webbing. Run the webbing through the top and bottom closing loops on the right side of the bag. Tie the ends of the webbing together with a surgeon’s knot and a locking knot.

Figure 9-4. Extraction Line Attached to 15-foot Extraction Line
- **One 22-Foot Cargo Extraction Parachute.** The 22-foot cargo extraction parachute uses a 60-foot (3-loop), type XXVI nylon webbing extraction line. Using a 3 3/4-inch, 2-point link assembly, attach the line to the parachute by adapting the procedures shown in Figure 9-5.

- **One 28-Foot Cargo Extraction Parachute.** The 28-foot cargo extraction parachute uses a 60-foot (3-loop), type XXVI nylon webbing extraction line. Using a 5 1/2-inch, 2-point link assembly, attach the line to the parachute by adapting the procedures shown in Figure 9-5.

*Note.* See Table 9-2 to determine the proper link assembly (3 3/4- or 5 1/2-inch) to use.

---

1. Place a large spacer on each bolt of the two-point link assembly.
2. Fit the adapter web loop on one of the spacers attached in step 1 above.
3. Fit the loop of the 60-foot extraction line on the free spacer of the two-point link assembly.

<table>
<thead>
<tr>
<th>1</th>
<th>Place a large spacer on each bolt of the two-point link assembly.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Fit the adapter web loop on one of the spacers attached in step 1 above.</td>
</tr>
<tr>
<td>3</td>
<td>Fit the loop of the 60-foot extraction line on the free spacer of the two-point link assembly.</td>
</tr>
</tbody>
</table>

**Figure 9-5. Extraction Line Attached to 22- or 28-Foot Cargo Extraction Parachute with a 3 ¾- or 5 ½-Inch, Two-Point Link Assembly**
4. Run a length of cloth-backed tape around the adapter web keeper.

5. Run a length of cloth-backed tape around the extraction line keeper.

6. Bolt the side plate to the two-point link assembly. Use a wrench to tighten the nuts. Run a length of tape around the link and over each nut and bolt end.

7. For a 22-foot cargo extraction parachute, run a length of type I, 1/4-inch cotton webbing through the top and bottom bag closing loops on the right side of the bag. For a 28-foot cargo extraction parachute, run a double length of type I, 1/4-inch cotton webbing through the top and bottom bag closing loops on the right side opposite where the adapter web exits the bag.

8. Run type I, 1/4-inch cotton webbing through the two-point link assembly, and tie the ends of the webbing together with a surgeon’s knot and a locking knot.

Figure 9-5. Extraction Line Attached to 22- or 28-Foot Cargo Extraction Parachute with a 3 3/4- or 5 1/2-Inch, Two-Point Link Assembly (Continued)
- **Two 28-Foot Cargo Extraction Parachutes.** A cluster of two 28-foot cargo extraction parachutes as shown in Figure 9-6, is attached to one end of a 60-foot (6-loop), type XXVI nylon webbing line. The other end of the line is attached to the four-point link assembly of the parachute cluster after the cluster has been installed in the aircraft.

**EXTRACTION PARACHUTE CLUSTERS**

9-8. Cluster two 28-foot cargo extraction parachutes for an initial extraction as shown in Figure 9-6 and for a sequential extraction as shown in Figure 9-7.

1. Tape the V-rings of the bottom parachute to the deployment bag.
2. Be sure 9 to 12 inches of the adapter web extend beyond the bag tie.
3. Place a second parachute on top of the first.
4. Tie the parachute deployment bags together at each corner with single lengths of type III nylon cord.

![Figure 9-6. Clustering Extraction Parachutes Clustered for an Initial Extraction from C-130 Aircraft](image-url)
5 Run the safety loop of the top parachute through the safety loop of the bottom parachute, and hook it behind the bent V-ring of the top parachute.

6 For transportation only, tie the pendulum line of the top parachute to the bent V-ring. Fold the excess line, and tape the folds in place.

7 Fold the pendulum line of the bottom parachute, and tape the folds in place.

8 Pull each bridle loop from its bag far enough to untie the bag retaining lines. Remove these lines.

Figure 9-6. Clustering Extraction Parachutes Clustered for an Initial Extraction from C-130 Aircraft (Continued)
CAUTION
Be sure the bag retaining tie does not pass through the bridle loop of the top parachute.

9 Use a 103-inch length of 1-inch tubular nylon webbing for the bag retaining tie. Run the tie through the bag retaining straps of the bottom parachute, through the bridle loop, and up through the bag retaining straps of the top parachute. Tie the ends of the retaining tie together with a surgeon’s knot, a locking knot, and an overhand knot in each running end.

10 Tie the bridle loops together with one length of type III nylon cord to form a break cord.

11 Place a cotton buffer on the bottom pin of the four-point link assembly.

12 Place the free end of the extraction line on the bottom pin and the separator. Divide the plies between the pin and the separator.

13 Fold the bag retaining tie, and tape the folds in place.

14 Place the top adapter web on the left pin. Place the adapter web of the bottom parachute on the right pin and replace the link cover. Push the keepers against the pins, and tape the keepers in place with cloth-backed tape.

15 Tie the link assembly to the upper bag closing loops of the top parachute with one length of type III nylon cord. Make sure the cord passes through the link assembly and under the top pins.

Figure 9-6. Clustering Extraction Parachutes Clustered for an Initial Extraction from C-130 Aircraft (Continued)
1 Remove the safety loop from around the bent V-ring. Extend the safety loop around the opposite side of the bag from the bent V-ring, and tie it tightly in place with the pendulum line.

2 Be sure 9 to 12 inches of the adapter web extend beyond the bag closing tie.

3 Prepare a second parachute as in steps 1 and 2 above and place it on top of the first parachute.

4 Tie the parachutes together at each corner with single length of type III nylon cord with a surgeon's knot, a locking knot, and an overhand knot in each free end.

Figure 9-7. Clustering Extraction Parachutes for a Sequential Extraction
5 Pull each bridle loop from its bag far enough to untie the bag retaining lines.

6 Use a 103-inch length of 1-inch tubular nylon webbing for the bag retaining tie. Run the tie through the bag retaining straps of the bottom parachute, through the bridle loop, and up through the bag retaining straps of the top parachute. Tie the ends of the retaining tie together with a surgeon’s knot, a locking knot, and an overhand knot in the running end.

7 Tie the bridle loops together with a single length of type III nylon cord.

8 Fold and tape the bag retaining tie.

9 Place the top adapter web on the left pin. Place the adapter web of the bottom parachute on the right pin and replace the link cover. Push the keepers against the pins, and tape the keepers in place with cloth-backed tape.

10 Tie the link assembly to the upper bag closing tabs of the top parachute with a single length of type III nylon cord. Make sure the cord passes through the link and under the top pins.

11 Place a cotton buffer on the bottom pin of the four-point link assembly.

12 Place the free end of the extraction line on the bottom pin and the line separator. Divide the plies between the pin and the separator.

Figure 9-7. Clustering Extraction Parachutes for a Sequential Extraction (Continued)
C-17 AIRCRAFT

9-9. Low velocity loads rigged for aerial delivery from the C-17 aircraft require an extraction line based on the size of the extraction parachute. All extraction lines used on loads rigged for the C-17 aircraft must be continuous, type XXVI nylon webbing. In addition to the extraction line and extraction parachute, the C-17 requires a 15-foot drogue parachute and a 60-foot (1-loop) drogue line. The drogue line is not required to be packed in a sling/extraction line bag. The C-17 utilizes a tow release mechanism which connects the drogue line to the extraction parachute(s) and extraction line bag. All extraction lines must be packed in a sling/extraction line bag. The C-17 can accommodate a single platform weight of up to 60,000 pounds with a total airdrop load weight of 100,000 pounds. The C-17 can accommodate up to 64 feet of type V airdrop platforms.

- **One 15-Foot Cargo Extraction Parachute.** Attach a continuous 160-foot (1-loop), type XXVI nylon extraction line rigged in accordance with TM 10-1670-286-20/TO 13C5-2-41. Due to the use of the tow release mechanism, the rigging procedures are very detailed and should be followed exactly.

- **One 22-Foot Cargo Extraction Parachute.** The 22-foot cargo extraction parachute needs a continuous 140-foot (3-loop), type XXVI nylon webbing extraction line rigged in accordance with TM 10-1670-286-20/TO 13C5-2-41.

- **One 28-Foot Cargo Extraction Parachute.** The 28-foot cargo extraction parachute needs a continuous 140-foot (3-loop), type XXVI nylon webbing extraction line rigged in accordance with TM 10-1670-286-20/TO 13C5-2-41.

- **Two 28-Foot Cargo Extraction Parachutes.** For a cluster of two 28-foot cargo extraction parachutes, the extraction line requirements can change based on where the platform is located in the aircraft. Normally the 140-foot (6-loop), type XXVI nylon webbing extraction line is utilized. If the platform’s aft edge is located aft of FS 680 the 120-foot (6-loop), type XXVI nylon webbing extraction line rigged in accordance with TM 10-1670-286-20/TO 13C5-2-41 may be used.

C-17 AIRCRAFT SEQUENTIAL PLATFORM EXTRACTION SYSTEM RIGGING

9-10. The typical installation of an extraction parachute and extraction line bag for sequential airdrop is shown in Figure 9-8.

*Note:* The aircraft loadmaster is responsible for rigging the sequential extraction system in the aircraft.

**CAUTION**

Failure to correctly position the extraction parachute(s) and extraction line bag could result in non-deployment of the parachutes.

*Note:* The following procedures are taken directly from TO 1C-17A-9. If there are any differences between the following procedures and TO 1C-17A-9, the TO 1C-17A-9 takes precedence.
Step:

1. Position the extraction parachute(s) and extraction line bag on the forward end of the proceeding load to prevent entanglement of the extraction line bag with the load or its suspension system.

Figure 9-8. Typical Extraction Parachute and Extraction Line Bag for Sequential Airdrop Installed
Step:

2. Secure the extraction line bag to the load. Fold the extraction line bag bridle under the extraction line bag before securing. Install three one turn single 1/2-inch tubular nylon webbing restraint ties through the top and bottom extraction line bag panel connector links and to convenient points on the load. Ties are routed on the load to prevent shifting of the extraction system and secured using a trucker’s hitch with three alternating half-hitches and an overhand knot in the running ends for each restraint tie.

CAUTION

The connector link(s) shall not be routed through the parachute canopy bridle loop. Failure to comply could result in non-deployment of the parachute(s).

3. Secure each extraction parachute(s) to the load. Route one turn double 1/2-inch tubular nylon webbing restraint tie through the connector link(s), around the bag bridle strap(s), and to a convenient point on the load. Secure with a trucker’s hitch, three alternating half-hitches, and an overhand knot in the running ends.

4. Use the carrying handle to secure the extraction line bag to the load. Route one turn double Type I, 1/4-inch cotton webbing restraint ties through the top and bottom carrying handles on each corner of the load attaching end of the extraction line bag to a convenient point on the load.

CAUTION

Link break cord ties for sequential airdrop must be of correct size. Failure to comply could result in non-deployment of the parachute(s).

Figure 9-8. Typical Extraction Parachute and Extraction Line Bag for Sequential Airdrop Installed (Continued)
5. Ensure link break cord ties are correct.
   - For 15-foot extraction parachutes, remove 1/2-inch tubular nylon webbing link break cord ties and replace with type III nylon cord.
   - For three 28-foot extraction parachutes, remove 9/16-inch tubular nylon webbing link break cord ties and replace with 1/2-inch tubular nylon webbing.

6. Prepare extraction line by removing temporary handling and transport ties.

**Note:** The extraction line is stowed in the extraction line bag with Type I, 1/4-inch cotton webbing restraint ties. It may be necessary to cut a number of restraint ties to obtain a sufficient length of extraction line to reach the EFTC. For in-flight rigging, the restraint ties should be cut on the ground.

7. Pull the required length of extraction line from the load attaching end of the extraction line bag for attachment to the EFTC.

8. Repeat steps 1 through 7 for additional platforms.

**Figure 9-8. Typical Extraction Parachute and Extraction Line Bag for Sequential Airdrop Installed (Continued)**
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Chapter 10
Transportation of Rigged Loads

SECTION I-GENERAL INFORMATION

RESPONSIBILITIES

10-1. The using unit is responsible for coordinating transportation of the rigged load from the rigging site to the aircraft. To prevent damage, loads must be lashed to the transporting vehicle and protected during transport. The transporting force must ensure that the off-loading equipment is compatible with the aircraft to be used.

TYPICAL LOADING AND TRANSPORTING EQUIPMENT

10-2. Some of the equipment that may be used to load and transport rigged loads is listed below.

- **Materials Handling Equipment.** If a loading ramp is not available to use in loading the rigged load onto the transporting vehicle, the load is hoisted aboard the vehicle. The materials-handling equipment used to hoist the loads may include but not limited to the 5-ton wrecker, the 10,000- or 15,000-pound-capacity warehouse crane, or 5,000 pound through 15,000-pound-capacity forklift trucks.

- **Transporting Vehicle.** Any standard military truck or semi-trailer with sufficient cargo space and payload capacity can be modified to transport a rigged load from the loading area to the cargo aircraft. However, not all military trucks are compatible with the cargo-loading system of all types of cargo aircraft now in use. Rigged platform loads require straight-in loading over a horizontally positioned ramp from a truck, a forklift, a flatbed, or a cargo loader. Consequently, this may require transfer of the rigged load at the aircraft site before it is off-loaded into the cargo aircraft. The following types of materials-handling equipment can be used to transport and/or off-load platform loads:
  - The 6- or 10-ton cargo semi-trailer can transport loads rigged on airdrop platforms.
  - The 25,000-pound-capacity cargo loader can move the maximum weight of 25,000 pounds up a 3-percent incline at 15 miles per hour. It can be used for loading all aircraft.
  - The 40,000-pound-capacity cargo loader can move the maximum weight of 40,000 pounds up a 3-percent incline at 15 miles per hour.
  - The 60,000-pound-capacity cargo loader (the Tunner) can move the maximum weight of 60,000 pounds up a 3-percent incline at 15 miles per hour.
  - The model M172 (lowboy) semi-trailer can load a C-130 aircraft. Any similar vehicle can be used if its loading floor meets the cargo floor heights of the aircraft. For C-130 aircraft, this is 39 to 42 inches.

SECTION II-RIGGING INFORMATION

MARKING RIGGED LOAD

10-3. Each rigged load must have a data tag prepared for it, and some rigged loads may require a Shipper’s Declaration for Dangerous Goods. The center of balance must also be clearly marked on both sides of the platform.
• **Data Tag.** A data tag is prepared and secured to each platform load near the extraction system. Entries on the tag are used in making inspections and in finding causes for malfunctions. The entries are also used to help the loadmaster determine where to place the load in the aircraft. Use a ballpoint pen or other waterproof marking device to record the following information on the tag:
  - Total rigged weight.
  - Height, including parachutes.
  - Overall length.
  - Overhang (specify front, rear, or side of load).
  - Longitudinal center of balance (measured from the front edge of the platform).
  - Type and size of extraction system.

• **Shipper’s Declaration of Dangerous Goods.** This form is prepared and secured on each load that has any type of hazardous material such as fuel, ammunition, or a battery.

• **Center of Balance.** In addition to being included on the data tag, the longitudinal center of balance must also be marked on the platform. The vertical line of the symbol CB is placed at the center of balance on both sides of the platform.

### TYPES OF INSPECTION

10-4. The types of inspections performed on a rigged load are the final rigger inspection, the before-loading inspection, and the after-loading inspection as required by FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and AR 59-4/OPNAVINST 4463.24C/AFJ 13-210(I)/MCO 13480.1B. All rigged low-velocity loads must be inspected at prescribed intervals to make sure that the loads and the equipment used on the loads are assembled and installed to meet the criteria outlined in the specific rigging manual.

• **Final Rigger Inspection (Shop Final).** After the load has been completely rigged, a certified Transported Force Rigger Inspector performs the final rigger inspection. This inspection is accomplished before the rigged load leaves the rigging site to make sure it is rigged according to the specific field manual/technical order for that particular load. This inspection should be conducted by an inspector other than the rigger supervising the installation of parachutes and extraction system. It is not necessary to use the DD Form 1748 (Joint Airdrop Inspection Record [Platforms]-series inspection forms for this inspection.

• **Before-Loading Inspection.** A before-loading inspection must be performed on a rigged load before it is loaded into the aircraft. This inspection is conducted jointly by a certified Transported Force Rigger Joint Airdrop Inspector and a certified Air Force Joint Airdrop Inspector. The inspectors use the proper joint airdrop inspection record, and both sign the appropriate blocks to certify correct rigging of the load. When the rigged load is delivered to the aircraft, the aircraft loadmaster checks the inspection form for completion and necessary signatures before accepting the load.

• **After Loading Inspection.** After the loadmaster completes the loading and in-aircraft rigging, the after-loading inspection is performed. This inspection is conducted jointly by a certified Transported Force Rigger Joint Airdrop Inspector and a certified Air Force Joint Airdrop Inspector, and the aircrew loadmaster. After the inspection is completed, the three inspectors certify, by signing the form, that the load is ready to airdrop.

### EMERGENCY AFT RESTRAINT REQUIREMENTS FOR PLATFORM-EXTRACTED LOADS RIGGED ON A TYPE V PLATFORM

10-5. Use Table 10-1 as a guide for determining the emergency aft restraint requirements for platform-extracted loads rigged on a type V platform.
Table 10-1. Emergency Aft Restraint Requirements for Platform-Extracted Loads Rigged on a Type V Platform for Airdrop from a C-130 Series Aircraft

<table>
<thead>
<tr>
<th>Cargo Extraction Parachute</th>
<th>Chains Required</th>
<th>Attachment Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-foot</td>
<td>Two 10,000-pound. One chain to each clevis</td>
<td>Two medium suspension clevises. One clevis is attached to the top emergency aft restraint provision hole of each tandem link.</td>
</tr>
<tr>
<td>22-foot</td>
<td>Four 10,000-pound. One chain to each clevis.</td>
<td>Four medium suspension clevises. Two clevises are attached to the top two emergency aft restraint provision holes of each tandem link.</td>
</tr>
<tr>
<td>One 28-foot</td>
<td>Six 10,000-pound. One chain to each clevis.</td>
<td>Six medium suspension clevises. Two clevises are attached to the top two emergency aft restraint provision holes of each tandem link. The third clevis is attached to the front tandem link hole.</td>
</tr>
<tr>
<td>*Two 28-foot</td>
<td>Two 10,000-pound. One chain to each clevis.</td>
<td>Two medium suspension clevises. One clevis is attached to the top emergency aft restraint provision hole of each tandem link.</td>
</tr>
</tbody>
</table>

**WARNING**

*This emergency aft restraint is used only to secure a loose platform in the aircraft if the right hand locks release prior to green light. Do not attempt to restrain two 28-foot extraction parachutes deployed outside the aircraft.*
# Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<td>ACB</td>
<td>attitude control bar</td>
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<td>ACL</td>
<td>allowable cabin load</td>
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<td>ACPR</td>
<td>automatic cargo parachute release</td>
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<td>AD</td>
<td>airdrop</td>
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<td>AFB</td>
<td>Air Force base</td>
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<td>AFMAN(I)</td>
<td>Air Force Joint Manual</td>
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<td>AFR</td>
<td>Air Force regulation</td>
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<td>AFTO</td>
<td>Air Force Technical Order</td>
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<td>AGL</td>
<td>above ground level</td>
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<td>ALC</td>
<td>Airlift Logistics Center</td>
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<td>AR</td>
<td>Army Regulation</td>
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<td>AWADS</td>
<td>Adverse Weather Aerial Delivery System</td>
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<td>CB</td>
<td>center of balance</td>
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<td>DA</td>
<td>Department of the Army</td>
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<td>extraction parachute jettison device</td>
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<tr>
<td>PIP</td>
<td>push in, pull out</td>
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<td>SEE</td>
<td>small emplacement excavator</td>
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<td>ROWPU</td>
<td>Reverse Osmosis Water Purification Unit</td>
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DA Form 2028. Recommended Changes to Publication and Blank Forms.

DD Form 1748-series. Joint Airdrop Inspection Record (Platforms).

Shipper’s Declaration for Dangerous Goods. Locally procured form.
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General, United States Army
Chief of Staff

Official:

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