



COMMON HELICOPTER TOOLS AND HELICOPTER APPLICATIONS

(External Load Operations)



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Introduction

The following discussion outlines typical helicopter applications. It is assumed that experienced pilots using aircraft appropriate for the tasks carry out these activities.

Additionally, the information presented here assumes that vertical reference skills and a long line are used in all external load flight applications.

Depending upon the particular logistical requirement, the aircraft may deliver the required load or loads with a combination electrically and manually opening hook or a group of such hooks, which allows materials to be safely and precisely delivered to or and extracted from sites unsuitable for helicopter landings.

Proper external-load, rigging equipment and experienced vertical reference pilots are essential to the appropriate safety of these operations.



COMMON HELICOPTER APPLICATIONS AND HELICOPTER TOOLS (External Load Operations)

I. External Load Tools for Helicopters

- **Vertical reference flying:** Pilot establishes visual contact with the external load while maintaining control of the aircraft during the delivery and extraction of the load. This method of external load flying is safer, more productive and allows for more applications than the conventional methods using mirrors, marshallers and cockpit communication transfer.
- **Long line:** Provides vertical access for delivery and extraction of loads to areas where a helicopter cannot land. Such as, hill sides, roof tops, between buildings, near trees or other obstacles. Used in all external load operations.
- **Remote cargo hook:** Load is attached to hook connected at lower end of long line, allowing helicopter to hover above obstacles or sites unsuitable for landing.
- **Multiple hook carousel:** Allows for more than one load to be carried and delivered to different locations during a single flight.
- **Multiple hook spreader bar:** Provides for delivery of large loads, requiring balanced flight or precision placement, to be lifted, positioned and released with a minimum requirement of manpower.
- **Heli-Basket:** An effective rescue tool for personnel trapped in areas unsuitable for helicopter landings. Provides protection for deliveries of critical cargo from cargo net compression. Items, which are aerodynamically unstable, can be placed inside the basket and flown and delivered safely. Heli-Baskets are easily configured to satisfy a variety of needs such as disaster relief, survival supplies, firefighting tools, etc.
- **Bambi Bucket:** A rapid deployment method for carrying water to fight wild fires. Provides the fastest means for the construction helicopter to transition to an effective fire-fighting helicopter.
- **Cargo net:** Used extensively in construction to carry bulk cargo such as bags of concrete that may or may not be on pallets

- **Spider Cable Assembly (2,3 and 4 point):** Used for carrying large items or items having more than one pick-up point. These rigging tools allow a load to be flown in a specified position while protecting the load from being deformed by it's own weight. Spider assemblies provide stability to the load while it is being carried.
- **Pipe sling:** Used for carrying various types of pipe. The sling secures to pipe ends, preventing rigging slippage, while allowing pipe to be transported horizontally and remaining stable during flight.
- **Grapple:** used in the absence of ground crew to engage and transport rocks and logs or any item not sensitive to compression damage.
- **Swivel:** Used in conjunction with all of the above tools to transport external loads. Electric currents continuously pass through the swivel to the remote hook or grapple. The swivel prevents curling and kinking of the long line.

II. External Load Helicopter Applications

- **Emergency Rescue Support**
 - a. Tools Used
 - Heli-Basket
 - b. Typical Applications
 - Extraction of injured personnel from areas where helicopters cannot land or other types of equipment cannot operate
 - Transport and precision placement of emergency response equipment and supplies in otherwise inaccessible areas
 - Easily configured as standby modules for:
 - Emergency rescue
 - Emergency response module
 - Disaster relief and survival module
 - Generation and lighting module
 - Hazmat module
 - Water purification module
 - Pump and hose module
 - Environmental response module

- **Transport of Cargo and Equipment**

- a. Tools Used

- Cargo Hook
 - Multi Hook Carousel
 - Cargo Net
 - Heli-Basket
 - Spreader Bar
 - Pipe Sling
 - Spider Cable Assembly

- b. Typical Applications

- Useful for any item that can be carried externally
 - Transport of large and small equipment
 - Transport of building materials
 - Transport of food and water

- **Firefighting**

- a. Tools Used

- Bambi Bucket
 - Heli-Basket

- b. Typical Applications—Bambi Bucket

- Water drops on fire

- c. Typical Applications—Heli-Basket

- Water Tank Transport
 - Transport of tools and small vehicles
 - Transport of water pump and hose
 - Transport of supplies and materials

- **Construction**

- a. Tools Used

- Cargo Hook
 - Multi Hook Carousel
 - Cargo Net
 - Heli-Basket
 - Spreader Bar

- b. Typical Applications

- Transport water pumps to water source and layout of associated water hose
 - Transport drums of potable water, fuels, oils, etc
 - Transportation and layout of pipe

- Transportation and placement of bridge sections
- Transportation and placement of communication repeater tower
- Electrical transmission tower erection and cable pulling
- Concrete transport and pouring
- Transport of bulk materials
- Transportation of land and sea containers
- Layout of hose, rope, wire and cable across bodies of water and rough terrain
- Airborne emergency communications relay station (aircraft to aircraft or aircraft to ground)
- Transportation and assisted assembly of heavy equipment
- Setting steel beams.

- **Aerial Fertilizing and Seeding**

- a. Tools Used
 - Spreader Bucket (granular products)
 - Spray System (liquid fertilizer, herbicide)
- b. Typical Applications
 - Steep ground or remote site applications
 - Forestry
 - Agriculture

- **Logging Applications**

- a. Tools Used
 - Remote Hook (logging style)
 - Grapple
 - Bambi Bucket (fire prevention)
 - Heli-Basket (emergency rescue, equipment transport)
- b. Typical Applications
 - Heli-logging
 - Riparian Enhancement
 - Tree and obstacle removal from rivers



- **Remote Camp Support**
 - a. Tools Used
 - Cargo Hook
 - Multi Hook Carousel
 - Cargo Net
 - Heli-Basket
 - Spreader Bar

- **Typical Applications**
 - Transportation and precision placement of portable housing
 - Transport building materials
 - Re-supply
 - Food
 - Water
 - Parts