Air Ambulance Helicopter Landing Zone Procedures
Introduction

• The purpose of this briefing material is to provide first responders and local communities with the basic information necessary to assist in the selection, preparation and safe operation of a temporary landing zone (LZ) supporting BC Emergency Health Services (BCEHS) air ambulance helicopters.

• Please note that the final decision to operate from a landing zone (LZ) rests with the pilot-in-command.
Outline

- General Info
- Requesting an aeromedical helicopter
- Role of the Landing Zone (LZ) Safety Manager
- Selecting the Landing Zone (LZ)
- Hazard Identification
- Communicating with the aircraft
- Protecting the Landing Zone (LZ)
- Continuity of care – preparing the patient for transport
• A helicopter air ambulance will:
  – decrease transport time to definitive care
  – provide critical care capabilities on-scene and during transport
  – provide support in multiple casualty incidents

• BCEHS has helicopter contracts with two dedicated air ambulance providers and numerous ad hoc carriers in BC and Alberta

• The information in this brief is most applicable to our dedicated carriers
Sikorsky S76C+

- Vancouver & Prince Rupert
- Seats up to four medics and two patients
- Three aircraft in the fleet plus an S76A model as YVR backup
- 24/7 availability
- Night Vision Goggle equipped
- Cot must be returned to aircraft
Bell 412EPi

- Kamloops
- Seats up to 2 medics and 2 patients
- 12/7 availability
- Night Vision Goggle equipped (recent)
- Stryker cot can be swapped with ambulance cot
- Loudhailer
Ad Hoc Chartered Helicopters

- BCEHS uses the services of other providers where there is not dedicated helicopter coverage.

- These carriers have signed agreements to provide services at an agreed rate but do not have to keep aircraft or pilots on standby.

- Helicopter types vary and will not be equipped with medical interiors like dedicated helicopters.

- Not all Ad Hoc helicopters are suitable for all patients.
Requesting an Air Ambulance

• For scene response (pre-hospital care)
  – Call “9-1-1”
  – Areas where “9-1-1” not available: Toll Free 1.800.461.9911
  – Cellphone / Satellite Phone / Outside BC 250.374.5937

• Calls to “9-1-1” will be triaged based on standardized medical determinants. The BCEHS dispatch centre will deploy the most appropriate resource. A road ambulance may be assigned instead of an air ambulance
Info Required by BCEHS Dispatch from scene First Responders

• Scene / LZ location
  – Latitude and Longitude in degrees and decimal minutes (GPS coordinates) e.g. 47° 26.767’ N 123° 58.933’ W
    • Format – degrees/minutes and decimal (as above) or degree/minutes/seconds
  – Cross streets (intersection)
  – Closest city / town
  – Street address of the location
  – Well-known landmarks (distance & bearing/direction from)

• Warning of obstacles in the area that may present hazards to an arriving helicopter (e.g. wires, towers, etc.)
Role of Landing Zone (LZ) Safety Manager

• A Landing Zone officer should be appointed from the on scene responders to take responsibility for landing zone selection and safety duties.

• The Landing Zone Safety Manager should **NOT** be involved in scene operations or patient care.
LZ Safety Manager – duties (pre-helo arrival)

- Coordinate activities with incident/scene command personnel

- Select an appropriate LZ

- Identify helicopter briefing points:
  - wind direction
  - obstacles (wires, antennas)
  - Other hazards (“if in doubt, point it out”)

- Liaise with fire department (if available) to anticipate fire suppression activities in the event of an aircraft accident

- Conduct a LZ team briefing to ensure hazards have been identified, roles (especially who will be controlling LZ access/keeping bystanders away) and responsibilities clarified, and that landing/departure procedures are understood

- Ensure that all vehicles and non-essential personnel remain clear of the LZ safety area during helicopter operations
LZ Safety Manager – Duties (helo 5 minutes back)

- Put safety vest on in order to be easily identified by Helo.

- Stand back to wind and when visible to helo point in landing direction.

- Establish radio communications with the arriving helicopter on PEPCOORD 1 or EComm combined events (in EComm coverage area)

- Brief helicopter on LZ (wind, obstacles, hazards, suggested approach path)

- Advise the flight crew when the LZ is prepared and secured (“locked-down”)

- Maintain “lock-down” until relieved by the flight crew

- Ensure that ground personnel do not approach the helicopter until after the rotors have stopped turning, the engines secured, and only when specifically requested to approach by the flight crew or flight paramedics
Selecting an LZ

- The pilot-in-command has final authority over LZ suitability. During the initial LZ reconnaissance, the flight crew may select a different landing area.

- Select an LZ that is adjacent to the scene to avoid the need for ground transport that could prolong a patient’s pre-hospital time.

- The LZ should be at least 50 paces (150 feet) away from the accident or patient care location.

- If practical, the LZ should be downwind of the scene unless a HAZMAT incident is present. If the LZ must be located upwind of the scene, the distance from the LZ to the accident site should be increased as much as possible to avoid helicopter downwash creating a hazard to first responders and compromising patient care.

- If the LZ is dusty, ask the fire department to wet down the area to prevent a zero visibility situation when the helicopter lands.

- Fresh snow should be packed down to prevent whiteout conditions. If this is not possible, warn the flight crew of loose or powder snow conditions.
Approach/Departure Path

• The selected LZ must have an approach & departure path:
  – Preferably into wind, definitely not down wind
  – Free of obstacles to the greatest extent possible (e.g. wires, telephone/power lines, flag poles, etc.)
Obstacles

- To identify obstructions on the approach/departure path to the LZ, stand in the center of the landing area and raise one arm up at a 45-degree angle.
- Turn slowly through a complete circle and note any obstruction that appears above the level of your raised arm.
- Reference obstructions to the compass cardinal points (e.g. “Trees to the North and East; lamp posts to the Northeast”).
Obstacles – poles & wires

From the ground

From the air

• Parking a vehicle under wires crossing a road close to LZ is a good way to mark them
Landing point selection

- LZ = landing zone safety area + landing point
- Landing point is area within LZ where helo will touch down
- It must be:
  - clear of obstacles (e.g. tree stumps, fire hydrants, etc) as much as possible
  - Support helo weight
    - ~12,000 lbs for S76 & 412
    - ~5,000 lbs for AS350 AStar (common ad hoc charter aircraft – see below)

Notes:
- Helo weight may cause damage to infill supporting artificial turf
- Helo may be heavy enough to damage septic field
Landing Zone Safety Area

• The LZ safety area is an area surrounding the landing point (touchdown area) that will permit the safe landing, takeoff, and maneuvering of the helicopter

• The LZ safety area should be:
  – At least 40 x 40 paces (approximately 120 x 120 feet)
  – Free of debris that may be propelled by the rotor downwash
  – Firm and flat (less than 10 degree slope)
  – Free of stumps, brush, posts, large rocks or ditches which may damage the helicopter
  – Located downwind of the scene unless the accident site involves HAZMAT, in which case the LZ should be located upwind of scene
Walk the LZ to look for hidden debris that may fly up in rotor wash.
LZ Identification

• Identify and mark/delineate the LZ by one or more of the following methods:

• **Day**
  – LZ safety manager in **high vis vest, back to wind facing LZ, arms raised**
  – Corral formed by emergency vehicles and/or obvious natural boundaries
  – Weighted traffic cones placed at the corners and midpoints (if possible)
  – Fluorescent paint may be used to mark the perimeter or a large ‘H’ placed in the centre of the LZ. This is especially effective on snow covered surfaces

• **Night**
  – LZ safety manager in **high vis vest, back to wind facing LZ, arms raised**
  – Flashlights placed inside traffic cones / LED beacons / battery-powered “turbo flares” at the corners and midpoints (if possible)
    • Some red LED beacons are invisible to NVGs – ensure yours can be seen by NVG equipped pilots
  – Flight crew will generally request that strobes be turned off
  – Vehicles with headlights 30-50 ft away from LZ perimeter with lights on low beam pointed to cross at the centre of the LZ may be used. The vehicle lights should be pointed into wind
  – Do not shine vehicle lights towards helicopter landing, taking off or on the ground running.
  – Use spotlights to mark obstacles and poles with wires
  – Don’t shine lights directly at the helicopter
LZ Safety Manager signals

LAND HERE (DAY)

LAND HERE (NIGHT)

LZ UNSAFE (DAY)

LZ UNSAFE (NIGHT)
LZ Diagram

LZ manager:
- Back to wind
- Safety vest to ID for helo
- On PEPCORD1 or EComm combined events
- Arms raised then point to LZ centre when helo on short final

Night lighting
- IR/visible lights
- Vehicle 30-50ft back from LZ perimeter

* Helo approach path may be curved or from the side due to obstacles
LZ Don’ts

• Do not use people to mark the perimeter of the LZ
  – Do use people to control access to the LZ.
• Do not shine lights directly at the helicopter
LZ – Safety

• Use personal protective equipment
  – Helmet/hard hat with chinstrap (guard against unsecured flying debris)
  – Reflective vest
  – Eye protection (safety glasses, face shield – for flying debris/dust)
  – Hearing protection
  – Jacket and pants to cover bare skin
Hazards – Main Rotor

- Never approach helicopter when rotors turning!
Hazards – Tail Rotor

- Never approach helicopter with rotors turning
- Tail rotors are almost invisible when spinning
Hazard – Loose debris

- Rotor wash can be up to 150km/hr
- Remove or secure all loose debris from LZ and surrounding area
- Rotor wash can lift easily lift loose debris and objects
  - Injure people
  - Damage property
  - Ingested through helicopter intake and cause engine failure

Photos:
- plywood
- Tarps/blankets
- canopies
- Empty barrels
- Signs
- Plastic bags
Hazard - Noise

• Helicopter noise can startle livestock located near an LZ. Ensure animals are secure from the LZ.

• Engine & rotor noise will make communications difficult
Hazard – vehicles & traffic

• When possible, emergency vehicles should be used as a physical barrier to block LZ access

• Traffic should be blocked in both directions during approach/departure – even on divided highways – as flight operations will distract drivers.
Hazard – dust/snow

- Rotor wash may blow dust/snow and create white/brown out conditions
- If available in dusty conditions, consider using fire truck to wet ground prior to helicopter landing
Hazard - Drones

- At some scene responses, people may use drones to get a better view or to find out what’s going on.
Aircraft communications

• Direct radio contact is best

• Normally PEPCORD1 (148.655) or in EComm combined events channel in EComm coverage area. Alternately give dispatch a frequency to contact the helicopter.

• Information to communicate to helicopter:
  – ID yourself as LZ safety manager
  – LZ status (e.g. secure & ready for landing, in progress, not secure)
  – LZ location using cardinal references (N,S,E,W) to accident scene or landmarks
  – LZ markings
  – Wind direction/speed (estimated)
  – LZ hazards (e.g. poles, wires, trees, etc using N,S,E,W reference to LZ)
Final approach

• Once helicopter on final – LZ safety manager should clear outside safety zone

• Watch for hazards

• Minimize communications with aircraft to safety critical items

• If you see a hazard transmit “abort landing” x 3 over the radio or extend both arms over head and wave in a crossing motion

• Pilot in command has makes ultimate decision for LZ selection and landing decision
After landing

• Protect the LZ
  – be aware of vehicles or pedestrians approaching when rotor turning. Pilots cannot see anything approaching from behind

• Stay well clear of rotor and never approach aircraft when rotors turning

• Prevent people approaching helicopter until rotors have stopped turning and definitive “all clear” signal from pilots

• After shutdown, continue to control/guide vehicles near aircraft

• Time permitting – come talk to the pilots about helicopter operations
Take off

• Once helicopter close up and starting engines
  – Look for open doors, panes or straps hanging out – let helicopter know by radio
  – Keep radio in hand to advise pilots of any hazards
  – Keep radio channel open until aircraft is out of sight
  – Keep LZ clear of personnel and equipment until aircraft out of sight in case it needs to return at short notice
Continuity of care

- Flight paramedics will seek out primary ground caregiver of the patient
- Provide brief, concise report of patient condition
- Provide copy of patients ID and vital signs if possible
- Assistance may be required loading the patient – follow flight paramedic and pilot instruction
Hard landing/crash

• Do not approach helicopter until all moving parts have come to a complete stop
Conclusion

• LZ operations are a team effort
  – Establishing a safe LZ is critical to success of scene air medical evacuations

• For more info contact BCEHS Aviation
  – aviationservicesmanagemen@bcehs.ca
Questions?