National Defence / Défense nationale

B-GL-322-006/FP-003

TRAINING

DROP ZONE / LANDING ZONE CONTROLLER'S HANDBOOK

(ENGLISH)

(This publication is effective upon receipt.)

Issued on the authority of the Chief of the Land Staff

Canada

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FOREWORD

1. B-GL-322-006/FP-003 *Drop Zone / Landing Zone (DZ/LZ) Controller's Handbook* has been produced and is issued under the authority of the Commanding Officer, the Canadian Forces Land Advanced Warfare Centre (CFLAWC). This document is to provide guidance to DZ/LZ Controllers in the conduct of DZ/LZ operations. It is to be used in conjunction with, not as a replacement for, the references listed below.

2. Amendments will be promulgated and distributed as necessary by the CFLAWC. Persons in receipt of this document are responsible for ensuring that it is up to date.

3. Comments, suggestions, omissions and/or errors concerning this document should be forwarded to the CFLAWC, attention Standards Officer.

4. This document supersedes all previously published DZ/LZ Controller aide-memoires.

5. References in this handbook are taken from the following publications:

a. B-GJ-005-404/FP-040 *Movement Support Air*.

b. CFACM 60-2601, Vol. 1, *1 Canadian Air Division Standard Manoeuvre Manual Vol. 1*.

c. B-GA-444-001/FP-001 1 *Wing Tactical Aide-Memoire*.

d. ASCC 44/35.

e. Land Force Command Order (LFCO) 22-2.

f. ATP-49(C) *Use of Helicopters in Land Operations—Doctrine*.

g. C-22-011-200/CL-001 Part 2 *Low Velocity Air Dropping*.

h. C-22-010-020/TP-000 Part 2 *Investigation of Airdrop Malfunctions*.

i. C-22-011-200/CL-017 *Airdrop Recovery Procedures*.

j. C-12-146-000/MB-002 *CH-146 Griffon Flight Manual*.

k. B-GA-100-001/AA-000 *1 Canadian Air Division Flying Orders.*

l. *Interim Airmobile Standing Operating Procedures*.

6. Unless otherwise noted, masculine pronouns apply to both men and women.

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SECTION 1
GENERAL

INTRODUCTION

1. One of the essentials of any successful airborne (AB) operation (op) is the selection of a suitable area of ground for use as a drop zone (DZ). It is then necessary to guide the aircraft (A/C) by navigational aids to the general DZ area until it is sufficiently near to recognize ground markings on the actual DZ.

2. **Definition**: A DZ is a specified area upon which parachute troops, equipment, or supplies are air dropped. (NATO AAP-6 [2005])

3. **Requirement for a DZ Control Team**:

   a. For peacetime ops/exercises, a DZ Control Team will always be deployed to control a para-drop, except for special cases such as pathfinder drops (drops which consist of the DZ Control Team itself), which may be conducted without a DZ being setup and are conducted at the Airborne Force Commander's (AB Force Comd) discretion.

   b. When a DZ Control Team is deployed during ops/exercises, the DZ Controller, regardless of rank, shall be responsible to the AB Force Comd and have complete control of all non-tactical activities on the DZ until the drop is completed (i.e., not responsible for tactical conduct).

4. **DZ Controller/Pathfinder**:

   a. Only personnel that are trained in the selection and operation of a DZ (qualified and current TSQ AGMD; CSQ AEKJ) will carry out the duties of a DZ Controller.

   b. If pathfinder groups are to be used during airborne ops, only pathfinder-qualified personnel will command the group.

5. **DZ/LZ Command and Control (General)**:

a. The DZ/LZ Controller has command of the DZ and/or landing zone (LZ).

b. The DZ/LZ Controller is responsible to the AB Force Comd and the Airlift Commander (AL Comd) and is responsible for:

(1) Forwarding of the point(s) of impact (PI) coordinates to the AL Comd or his representative as required.

(2) Placing visual aids to provide adequate identification of the area.

(3) Ensuring the safety of the zone. The DZ/LZ Controller will issue final approval, prior to tactical air transport ops, in regards to the capability to accept parachutists, para-dropped equipment or air-landed ops.

(4) Air-ground-air communications between the DZ/LZ and the A/C.

(5) Providing drop score and damage assessment. Information will be recorded and forwarded to the AL Comd or his representative.

SECTION 2
DZ CONTROLLER TEAM—PERSONNEL AND EQUIPMENT

6. **Drop Zone Control Team Composition**:

a. For normal peacetime ops/exercises, the **MINIMUM** composition of the DZ Control Team will include:

(1) DZ Controller (qualified and current TSQ AGMD, CSQ AEKJ);

(2) Supply Tech 911 (Qual. 911.06 Rigger);

(3) DZ Communicator (ATR);

(4) Medical Officer/Assistant qualified 5a or higher (MO/MedA) for personnel drops only.

b. Normally one person performs each function. For equipment drops it is permissible to have one individual perform one or more functions as long as the required trades and qualifications are met.

7. **Drop Zone Team Responsibilities**. Depending on the type of op being conducted, the responsibility for detailed reconnaissance and defence of a DZ is that of the formation being supplied or supported. DZ layout is the responsibility of the Airborne Force (Pathfinders or the ground force being supplied or supported).

a. **Drop Zone Controller**. The DZ Controller is responsible to the AB Force Comd. He controls all non-tactical activities and is responsible for all aspects of safety on the DZ. His duties are detailed in Part 3 of this publication.

b. **Drop Zone Safety Officer**. One member of the DZ Control Team (normally the DZ Controller) will be designated as the DZ Safety Officer. In the event of an accident, the DZ Safety officer, via A/G/A radio, will call "STOP DROP" if in his judgement the accident, incident, injury will endanger oncoming parachutists.

8. **Equipment Requirements**:

a. DZ marking panels/RAM (raised angle marker)/lights/beacons (as applicable).

b. Communications equipment—ground to ground, air/ground/air.

c. Smoke or signal flares.

d. Anemometer.

e. Binoculars.

f. Camera, film and flash unit.

g. Compass (graduated in degrees).

h. Maps (as required).

i. Other equipment as required by the nature of the exercise or op (e.g., NVG for night drops).

j. For non-tactical drops, it is recommended that a 30-foot ladder, grappling hook with 30-foot rope, telescoping pole with hook, and a chain saw be included in the DZ kit.

9. **Transport Requirements**:

a. Drop Zone Controller vehicle all-wheel drive.

b. Ambulance all-wheel drive (preferably radio equipped).

c. Over-snow vehicle (as required).

d. Troop transport (as required).

e. Clearance and recovery transportation (as required).

10. **Documentation Required on DZ**:

a. Airdrop Malfunction Report (CF 1261).

b. Injury Report, locally produced as per unit standing operating procedures (SOP).

c. Post-drop Report.

SECTION 3
DUTIES

DROP ZONE CONTROLLER

11. **Prior to the Drop**. In accordance with LFCO 22-2: "Prior to each performance of DZ/LZ Controller duties, personnel qualified AGMD will certify that they have read and understood LFCO 22-2, Unit SOPs on DZ / LZ Operations, Range Standing Orders and the CFLAWC DZ / LZ Controller's Aide Memoire."

a. Report to AB Force Comd for briefing. The DZ Controller will be briefed by the AB Force Comd and AL Comd or by their delegated representative. Briefings to include landing plan and ground tactical plan, if applicable.

b. Draw necessary equipment and documents, especially para OP Order (DZ frequency and code words).

c. Assemble tasked personnel and transport.

d. Brief DZ Team.

e. Move to DZ.

f. Do a time check during briefing.

12. **Arrival at Drop Zone**:

a. Recce DZ (including alternate).

b. Ensure DZ is free of obstacles and hazards.

c. Establish locations for markings and determine positioning time. Set compass to 0 (zero) degrees declination.

d. Establish positioning and duties of DZ Team, vehicles (i.e., RV points and dump area).

e. Determine casualty evacuation routes and procedures to be followed.

f. Conduct full rehearsal of casualty evacuation procedures prior to drop if conducting intentional water drop training.

CAUTION

Assign positions and establish duties of Drop Zone team, vehicles, RV points and dump area. Ensure all personnel are aware of their responsibilities in the event of a fatality, complete malfunction or other significant/unusual occurrence.

g. Check surface wind, direction, and speed.

h. Activate the electronic aid, if applicable, on the PI ten (10) minutes prior to P Hour.

i. Stand by for initial contact.

WARNING

Only display the code identifier when all personnel are in position, out of danger area and ready to proceed. If at any time the DZ conditions become unsafe remove the code identifier from the PI.

13. **Initial Contact (inbound)**. Normally six (6) minutes prior to P Hour. Transmit wind direction (degrees) and speed in knots as follows:

a. Direction the wind is coming from in three figures (e.g., "ZERO THREE ZERO")..

b. Speed in knots (e.g., "WINDS ZERO THREE ZERO AT NINE KNOTS)".

c. If winds are gusting more than two (2) knots, transmit the extremes (e.g., "NINE TO TWELVE)".

d. Prepare smoke or flares for firing as applicable.

NOTE

For training missions, additional clearances to drop may be required from the air traffic control agency responsible for the airspace over the DZ. When this is necessary, it should be obtained prior to the six (6) minutes to avoid radio congestion just prior to drop.

14. **3 Minutes**:

a. Activate smoke or ignite fuzee, if required.

b. Ensure all personnel are positioned.

15. **1 Minute**:

a. Visually locate AC to confirm its approach.

b. Transmit wind direction and speed.

c. Transmit the order **CLEARED TO DROP** or **STOP DROP**.

NOTES

1. A **STOP DROP** may be called prior to the six (6) minutes.

2. A **STOP DROP** may be declared after the "1 minute" is called if the circumstances are clear, and the DZ has become unsafe.

16. **Radio Failures**.

ORDER	DAY	NIGHT
CLEAR TO DROP	Raised angle marker (RAM) or correct code identified on PI.	Lights or fuzee on PI.
DROP CANCELLED, PROCEED AS PER ALTERNATE PLAN	Incorrect or no markings on PI.	No lghts or fuzee on PI.
STOP DROP, ORBIT FOR ANOTHER PASS	Red smoke or flare.	Red flare.
DROP CANCELLED; PROCEED AS PER ALTERNATE PLAN	Red smoke or flare on second pass.	Red flare on second pass.

17. **Exit, Flight and Landing**:

a. Observe exits and deployments; in the event of any malfunction, dispatch parachute rigger (para rigger) to the scene.

b. If malfunction results in injury to personnel, ensure medical assistance is dispatched to the scene.

c. Observe landings of personnel. If personnel are injured, dispatch medical assistance to the scene.

d. Ensure there is no vehicle movement on the DZ until all landings are complete (vehicles stopped on the DZ are considered pin-point obstacles only).

NOTE

Some A/C commanders will advise the number of parachutists in the air.

18. The DZ Controller should acknowledge the number of parachutists in the air.

a. Immediately following a para-drop and before leaving the DZ area, the Formation/Aircraft Commander must provide the DZ Controller with the following information:

(1) Details on personnel and loads which could not be para-dropped and the reasons why.

(2) Action to be taken with remaining loads (e.g., additional pass, alternate plan, etc.).

(3) Whenever feasible the DZ Controller will pass a SITREP on drop accuracy and results (including casualties of personnel and equipment) by means of the Ground Comms rear link communications to the Mounting Base as soon as possible. See Art 310.7.1 below and Annex C.

19. The DZ Controller **must** keep a logbook for personnel para-drops in case an individual that may have been injured raises a CF 98 at a later date. See Annex E and G.

20. **Drop Score Procedure**:

a. Drop scores are provided to the AC; to the AL Comd or his representative for their use as a primary means of assessing crew airdrop techniques and the validity of training for both air and land elements. Drop scores shall be given during training scenarios for training purposes only.

b. The DZ Controller will not take the following procedure for granted. It will be included as part of the DZ briefing, and all parties will agree to its use prior to the drop, or no score will be given.

c. The DZ Controller will provide a drop score or damage assessment. It is imperative that this score be as accurate as possible, and not an approximation. Acceptable methods for finding distance are pacing, global positioning system (GPS), or laser range finder (e.g., use of Vector binoculars).

d. The "raw" information may be passed using air-ground-air communication with the AC; or in a formal report to the AL Comd or his representative, and will contain the following:

(1) Using the the clock ray method, indicate the position of the load or 1st man on the stick on the DZ in relation to the PI, where the PI is the centre of the clock and the centre of the trailing edge being the 12 o'clock position.

(2) Measure of distance from the PI to the load or the first man on the stick (given in m).

(3) A/C call sign (C/S), formation position or tail number.

(4) Time on target (TOT); that is, the time the load hit the ground (e.g., "TRUCKER 7, THIS IS DZ HODGSON…DROP SCORE 1405 HRS… 2 O'CLOCK…150 M…")

OFF DZ DROP / OFF DZ BOARD

21. Any personnel or equipment drops, which land outside the lateral dimensions of the DZ as defined by the DZ registration form, are termed an "Off DZ Drop." Such a drop can have serious and perilous implications particularly when personnel are involved.

22. In the event of an Off DZ Drop, the DZ Controller will immediately notify the A/C involved (formation lead for formation flights). If the A/C cannot be notified, the DZ Controller will contact his next level of command and ensure that the air force command and control agency is advised in sufficient detail to determine which AC, when and where the Off DZ Drop occurred, and all other pertinent information.

23. If the DZ is not required for additional para-drops, it is to be quarantined and its layout will be checked and verified by an independent DZ Controller (if available). GPS may be used if an independent source is not available. If the DZ is required for additional drops before verification is complete, and so that crews can be alert to any potential factor that could result in a recurrence, the DZ Controller will advise inbound A/C that previous drops have been Off DZ.

24. Once the DZ has been cleared it is the DZ Controller's responsibility to collect witness statements from all personnel involved with the drop (e.g., DZ Controller, DZ Communicator, para rigger(s), medic(s), general duties personnel, DZ Clearance party personnel, jumpers, etc.). These statements should include:

a. GPS coordinates of any personnel or equipment, which landed outside of the registered DZ boundaries.

b. As much detail as possible regarding weather conditions (e.g., wind on ground from anemometer/compass readings and in the air, which may be apparent visually or from jumper's description; ceiling; light conditions; precipitation, etc.).

c. The jumper's equipment and weight, including the type of parachute.

d. Any other details that could have affected the drop.

25. Copies of the statements, as well as the DZ Controller's Off DZ Report shall be forwarded to the Off DZ Drop Board as soon as possible after the incident.

NOTE

Keep a logbook on DZ condition, wind speed and direction, location of the landing point of the load in regards to the PI. Confirm the location of all markings with a GPS. All this info will be useful if a DZ Board is convened.

MALFUNCTIONS

26. **General**. The purpose of investigating accidents that occurred during air-transported ops is to determine the cause with the objective of preventing future injuries and loss of equipment.

DEFINITIONS

27. **Para Accident**. An occurrence directly related to a parachuting op, which results in loss of life, injury requiring hospitalization, or severe damage to equipment.

28. **Para Incident**. An occurrence with accident potential, including an Off DZ Drop.

RESPONSIBILITIES IN THE EVENT OF A MALFUNCTION

29. The unit of ownership of the personnel and/or equipment (including augmentees and equipment on loan) is responsible to investigate and report accidents or incidents that occur during air transported ops.

30. When an airdrop malfunction occurs, the para rigger, as the technical representative to the DZ Controller, shall be responsible for gathering the specific and detailed information required to complete the investigation as detailed in CFTO C-22-010-020/TP-000. **See C-22-010-020/TP-000 Part 6 (a) for personnel para malfunctions and/or see C-22-010-020/TP-000 Part 6 (b) for equipment para malfunctions.**

31. The best way to record specific information is by photographs. The para rigger will use the camera contained in the DZ Controller's kit to photograph specific details **before** the parachutist or equipment has been moved or disturbed.

32. Prior to conducting an initial investigation on a personnel parachute malfunction, it may be essential that medical treatment of a parachutist is needed. If the parachutist is injured and must be removed from the harness by the MO/MedA, ensure the parachute is disturbed as little as possible. If possible and practical, photographs shall be taken of the parachutist before he is removed from the harness.

PROCEDURES

33. Para accidents, incidents or malfunctions that result in damage to equipment, injury to personnel, or have the potential to cause damage or injury, will be investigated and reported by the unit of ownership in accordance with current command directives and applicable CFAOs and DAODs. In the case of serious occurrences, which could have resulted or did result in serious injury, death and/or heavy damage or destruction of a major piece of equipment, the unit commander will:

a. Appoint an investigating officer.

b. Ensure that all evidence is preserved until the investigation is closed.

c. Within 24 hours, dispatch a preliminary message, attention CLS (ACOS), 1 CAD HQ/D/A3, info NDHQ/DLO, CFLAWC Trenton, TRSET Trenton and 425(T) Sqn E Fit, if the occurrence was related to para operations. The message will contain the following:

(1) Subject, type of occurrence.

(2) Name of personnel/type of equipment.

(3) Location.

(4) Date of occurrence.

(5) Prevailing weather conditions.

(6) Extent of injury/damage.

(7) Investigating officer's name.

(8) Whether investigation is being carried out in accordance with QR & O Chapter 217.

(9) Preventive measures are enforced/recommended pending results of investigation.

(10) Remarks.

34. Closing Down of the Drop Zone:

a. Ensure all personnel on the manifest are accounted for and collect all manifests.

b. Ensure any injured personnel have been treated/evacuated.

c. Ensure DZ is cleared of all stores/vehicles, or that a clearance party has assumed the responsibility.

d. Ensure all DZ markings are retrieved.

e. Secure any permanent facilities.

f. Clean and return all equipment and stores.

g. Submit all necessary reports.

h. Leave the DZ last.

NOTE

After an accident, a CF 663 Accident Prevention Report will have to be completed. Problems with equipment will be dealt with by completing a CF 777 (Unsatisfactory Condition Report [UCR]). See Annex H and I.

COMMUNICATION WITH THE AIRCRAFT

35. Comms with the DZ Crew:

a. **Full Comms**. The formation and DZ Team monitors the DZ freq. The formation will initiate at approximately six (6) minutes (Inbound). The DZ Controller will transmit DZ information wind speed and direction. The formation will initiate at the "1 minute." The DZ Controller will transmit wind speed and direction, and **CLEAR TO** or **STOP DROP**.

b. **Blind Comms**. The formation monitors, but does not make any transmission on the DZ frequency. The DZ Controller will transmit DZ information "in the blind" at the approximate six (6) minute point and at "1 Minute" based upon the TOT.

c. **Silent Comms**. The formation and DZ Controller monitor the DZ frequency, but make no transmission. The correct code identification means "CLEARED TO DROP." Aircrew utilizes alternate methods to establish DZ surface wind.

d. **No Comms**. The formation and DZ Controller do not monitor the DZ frequency. The correct code identification means **CLEARED TO DROP**. Aircrew utilizes alternate methods to establish DZ surface wind.

SECTION 4
RECONNAISSANCE AND DZ LAYOUT

DROP ZONE SELECTION (PERSONNEL AND EQUIPMENT)

36. The initial DZ selection is the responsibility of the AB Force Comd, as it is from these zones that he must operate. The AL Comd is responsible for the actual airdrop. The final selection must therefore be a joint decision.

RECONNAISSANCE

37. **General**.

a. The detailed reconnaissance of the area allotted by the formation headquarters will be carried out as early as possible by the DZ Controller. The DZ Controller should have as much of the following information as possible before beginning his reconnaissance:

(1) The exact limits of the area within which the DZ is to be sited.

(2) The tactical situation in the vicinity of the DZ.

(3) The exact time of the arrival of the first A/C over the DZ.

(4) The number of A/C per sortie and flight information.

(5) If supplies are being dropped, the type, quantities of each commodity, and the method used, heavy or light container loads.

(6) The direction of approach to the DZ.

(7) If DZ clearance and recovery is necessary, what personnel and transport is available.

b. The DZ Controller, or Pathfinder team must take into consideration:

(1) A suitable area for DZ control.

(2) If DZ clearance and recovery is necessary, a lying-up area for transport and personnel.

(3) If required, a dump area for de-rigging and commodity breakdown, routes to and from for transport.

(4) Ideal locations for DZ marking aids and beacons.

(5) The selection of alternate DZs.

38. **Ground**. In selecting types of ground on which to site a DZ, it will often be found that whereas the land element requires an area that is easily defended and not open to enemy fire, the air element prefers a piece of open ground which is easy to approach and locate. Below are three examples of ground, which would make a good DZ providing the tactical situation permits their use:

39. **Types of Ground**:

a. A long stretch of road, clear of trees and power lines.

b. Crossroads or tracks that divide the surrounding area into sections.

c. A number of fields in a straight line divided by low fences or hedges.

NOTE

During peacetime ops, privately owned property might be used if the owner agrees. The form "Permission to Use Non DND Property" will have to be completed and approved before the drop. See Annex F.

CONSIDERATIONS

40. The following points must be considered in DZ selections:

a. **Terrain**. The DZ and its surrounding area should be reasonably level and free of obstructions, such as fences, ditches, hedges, high-tension wire and rivers or deep streams. The ground itself should be sufficiently firm under adverse weather conditions to permit unhindered use by loaded vehicles. The decision to accept an obstacle or hazard on the DZ rests with the AB Force Comd.

b. **Safety Zone**. For peacetime training, a 100 m safety zone will be established around the calculated DZ perimeter. This safety zone should meet the safety criteria that apply to the actual DZ.

c. **Water**. Rivers, lakes and other bodies of water located within 1000 m of the DZ edge proper are potential obstacles. For purposes of parachuting safety, water obstacles are considered in two categories:

(1) **Hazardous**. The presence within 1000 m of the DZ edge proper of a body of water with any of the following conditions will preclude the use of the area as a DZ:

(a) Water of unpredictable or unknown depth.

(b) Less than 3 m deep with an excessively soft or muddy bottom, which might entrap a parachutist.

(c) Less than 3 m deep with underwater vegetation, which could entangle a parachutist.

(d) Less than 3 m deep with a rocky bottom, which could injure a parachutist.

(e) A current in excess of 1 m per second.

(f) A water temperature lower than ten (10) degrees Celsius in a situation such that immersion could be for a period of two of more minutes.

(2) **Permitted**. A body of water deeper than 1 m, but not otherwise dangerous, is an allowable obstacle. Such an obstacle may be located anywhere within the DZ under the following conditions:

(a) Every parachutist is wearing an approved flotation device.

(b) All parachutists receive refresher training in water landings within three months prior to the jump.

(c) Safety boats are manned and deployed in sufficient numbers to quickly recover all parachutists (number to be determined by the AB Force Comd except for an intentional water drop, in which case there shall be one boat for every four parachutists).

(d) When parachuting onto any DZ, any part of which lies within 1600 m of a water hazard, every parachutist must wear an approved flotation device.

(3) **Ice**. Ice-covered bodies of water are acceptable as DZ's for personnel provided

that the uniform thickness of the ice is at least fifteen (15) cm (six [6] inches) and requirements for heavy drop platforms shall be confirmed by engineer reconnaissance. In both cases, sufficient measurements must be taken to ensure that there are no weak areas.

(4) **Night**. Although the same criteria are applied at night, the degree of hazard should be seriously considered because of the relatively greater difficulty in identifying and avoiding obstacles.

d. **Hazards/Restrictions**. The decision to accept an obstacle or hazard on a DZ rests with the AB Force Comd. In training, personnel safety must take precedence over all tactical considerations. The following guidelines are provided:

(1) **Obstacles**. Ideally, a DZ should be flat, and have no trees, fences, roads, ditches, power lines, or buildings within the DZ edge proper, but minor obstacles are acceptable, provided that they:

(a) Are isolated and do not cover a significant area of the DZ.

(b) Can reasonably be avoided by a parachutist with a CT-1 parachute.

(c) Do not constitute a life-threatening hazard, or present a danger of serious injury to a parachutist.

(2) **Surface**. An ideal surface of flat sand, or low cut grass will seldom be available. Common sense must apply and hazards such as ruts and rocks, particularly in areas in which parachutists are most likely to land, should be avoided. If the surface is particularly rough, or frozen, consideration should be given to applying a lower than normal wind limit.

(3) **Gradient**. The gradient of the ground may be up to 30 percent, depending upon the strength of the wind. Where the gradient is greater than 15 percent, the line of drop should preferably be at a right angle to the greatest line of slope so that landing may take place around the same contour line. The drop height is calculated in relation to the highest point of the zone.

(4) **Other Areas**. If considered operationally necessary, para-drops may be made in wooded or forest areas, mountains, lakes, or sheltered water.

e. **Approaches**. The approach and departure paths should be clear of high obstacles so that A/C can manoeuvre safely. The downwind boundary should, wherever possible, be free from obstacles to permit recovery of stores blown off the DZ area.

f. **Accessibility**. The DZ should contain concealed lying-up areas for vehicles and be close enough to main routes to permit the rapid removal of loads. There must be no lightly classified bridges on the dispersal route(s) (i.e., no bridges at 9 ton capacity or less).

DROP ZONE DIMENSIONS/MARKING

41. **Types of Drop Zones**. There are two types of DZs:

a. **Personnel DZ**. Personnel may use either a static line or freefall parachuting method to reach the DZ. For either method, a different size of DZ is required.

b. **Equipment DZ**. Various types and sizes of equipment may be para-dropped using either the door or ramp of the AC. Light equipment (e.g., jerry-can loads, heavy machine gun, door bundle) is deployed out of the A/C door.

42. Heavy equipment (e.g., bulldozers, vehicles) is deployed via the ramp using a drogue chute to extract the platform(s) from the AC.

Other equipment is also deployed from the ramp, but is gravity-extracted (e.g. CCC-1 loads, wedge loads).

43. **Minimum DZ Dimensions**. The site of a DZ depends upon the type of drop (single ship or formation drop), the tactical situation (single or multiple pass), and the number of jumpers:

a. **Personnel (Static Line [S/L])**:

Length. The minimum length of a DZ is dependent upon the number of jumpers in the longest stick.

Minimum Length in M. Formula: (Based on number of jumpers in the longest stick) 500 m (1st jumper) + 70 m for each additional jumper

No. of Jumpers	4	10	16	20	30
Min DZ Length (m)	710	1130	1550	1830	2530

NOTE

Wedge/personnel length formula: (Based on number of jumpers in the longest stick) 710m (for wedge and 1st jumper) + 70 m for each additional jumper

Width: 500 m for a single A/C or 600 m for an A/C formation.

b. **Personnel (Military Freefall Parachuting [MFP])**. Due to the clandestine nature of freefall ops, the normal dimensions for DZs may be reduced considerably. Although a normal DZ is suitable, freefall DZs may be circular in shape with the following general guidelines:

(1) A radius of 50 m for personnel.

(2) A radius of 500 m when personnel and cylinder drops are planned.

c. In ops where square canopies are utilised, the DZ dimensions may be reduced considerably given the tactical situation and the authority of the Pathfinder commander who is normally the AB Force Comd.

d. Normal DZ marking can be utilized for freefall DZs. In peacetime exercises, wind direction marking should be used to assist free-fallers upon landing. These markings are not required, but if used, must be consistent with the tactical situation.

e. **Equipment (Heavy)**:

Length: 900 m (single platform) plus 400 m for each additional platform.

Width: 500 m, increased to 600 m for formation drop.

f. **Container Delivery System (CDS) (Gravity Extracted)**:

Length: Not less than 400 m in length for the first pair of containers, plus 50 m for each additional pair of containers.

Width: 200 m.

g. **Combined Equipment and Personnel Drops**. When combined personnel and equipment drops are planned, the DZ size will conform to the larger requirement in each dimension:

Length: Equipment minimum requirement plus an additional 70 m for each parachutist in the stick, for example:

(1) HE (single platform): 900 m + (70 m x no. parachutists in stick).

(2) CDS: 400 m (1st container) + 50 m (each additional container) + 200 m (Alternate Forward Barrier) + 70 m per jumper.

Width: 500 m for a single A/C or 600 m for a formation.

NOTE

The 200 m figure takes into consideration the removal of the alternate forward barrier and the repositioning of paratroops. The alternate forward barrier is used within the aircraft to provide tension on the gate during the drop to prevent the CCC-1 container(s) from rolling forward in the aircraft in case of a malfunction.

NOTE

CDS/gravity extracted airdrops will not be performed while in formation.

h. **Equipment (Light)**. The DZ criteria for light equipment will be determined by the aircrew in liaison with the user unit and are dependant upon the item to be dropped.

i. **Equipment (Free Drop Low Altitude Bundle).** The minimum DZ is 250 m long by 60 m wide for a single object. A safety zone must extend 100 m on each side of the centre line, 250 m from the PI to the leading edge, and 700 m beyond the PI.

44. **Safety Zone**. For peacetime training, a safety zone of 100 m around the DZ will be established. This safety zone should meet the safety criteria that apply to the actual DZ.

LAYOUT AND MARKING OF A DROP ZONE

45. **Essential**:

a. Ideally, all DZ are marked to give the following essential information:

(1) DZ identification by means of a code identifier, which is also the PI.

(2) Direction of run-in.

(3) DZ limits and/or boundaries.

b. To maintain security, the actual positioning of marking should be delayed until as near as possible to the estimated time of arrival of the first sortie.

46. **DZ Identification**:

a. **DZ Code Identification Letters**. These letters should be easily recognizable from the air at a vertical height of 1,500 ft, and from a distance of 3 nautical miles (nm). The code identifier letter will be selected from the following group only: A (ALPHA), C (CHARLIE), J (JULIET), R (ROMEO) and S (SIERRA). When multiple DZs (or DZs and LZs) are used in an op, each should be marked with a different code identifier. When using a DZ with one PI for troops and another PI for cargo, each PI is to be marked with a different code identifier. Code identifiers should be assigned in the operational instructions and/or agreed to at the mission planning briefing. A "T" shall be used for HAP (personnel) MFP drops. The "T" will be placed so that a parachutist making his final approach into the wind can "read" the "T." That is, the top portion of the "T" will always face into the wind. The minimum acceptable size of letters and symbols for DZ markings is 6 m X 6 m (20 ft by 20 ft); the most desirable size is 14 m x 14 m (45 ft x 45 ft).

b. **Leading Edge Panels**. Standard ground to air recognition panels will be used when available. These are fluorescent orange, yellow, red or white in colour and measure approximately 0.6 m X 1.8 m (2 ft X 6 ft). The colours should not be mixed in any one symbol. Leading edge panels are located 300 m on either side of the DZ centre line for a formation drop and 250 m for a single ship, as well as 300 m before the personnel PI or 500 m before the equipment PI. Each Leading edge panel will be 1 m X 6 m in size.

c. **Trailing Edge Panels**. Standard ground to air recognition panels will be used when available. These are fluorescent orange, yellow, red or white in colour and measure approximately 0.6 m X 1.8 m (2 ft X 6 ft). The colours should not be mixed in any one symbol. The trailing edge panel will be 1 m X 6 m in size.

NOTE

All markings are to be briefed to the aircrew during the DZ briefing.

d. **Raised Angle Marker (RAM)**. If used, these markers will be placed at the top of the code identifier, on the DZ centre line, towards the trailing edge. RAM may also be used to replace standard panel markers for marking leading and trailing edges.

47. **Drop Zone Marking**:

a. **Improvised Markings**. When standard panels are not available, substitutes such as bed-sheets, canvas or cloth material may be used. If time permits, the turf may be stripped to the required size and depth providing it contrasts to the surrounding terrain.

b. **Flares or Smoke**. Coloured smoke generators may be used to mark important key points (e.g., impact points). For small drops, pre-arranged coloured smoke or flares can be used to aid the A/C pilot in locating the DZ. There is always the possibility that smoke or flares will be seen by hostile forces and give them the opportunity of bringing effective fire on the DZ area.

c. **Tethered Marker Balloons**. Balloons should be clearly visible to the aircrew, but not at such a height as to obstruct the run-in.

d. **Heliograph Mirrors**. Use of a heliograph mirror may be used to aid the A/C in DZ acquisition from as far as 8 nm and should be used for all daytime missions. (Tactical and available light conditions apply).

48. The following should be considered essential to supplement visual aid:

a. **Electronic Aids**. The present range of homing aids have certain technical and operational limitations (beacon).

b. **Ground to Air Radio**. When communications security permits, ground to air radio should be used.

c. **Limit Markers**. Panels may be used to mark the corners or outline the perimeter of the DZ when security of the area permits. The trailing edge and leading edge of the DZ may be marked.

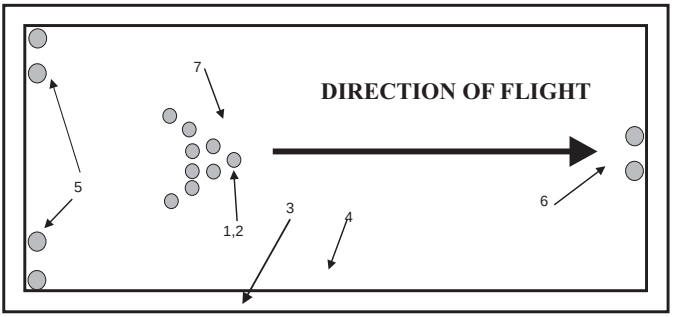
d. **Additional Markings**. When the DZ Controller or Pathfinder team responsible for marking the DZ has the required marking materials and adequate time for installation, the markings listed below are desirable and enhance visual communications between the DZ personnel and the aircrews:

(1) **Timing Points**. The purpose of timing points is to identify a point of known distance from the intended PI at which the aircrew can commence a time count to the computed air release point (CARP). During daylight ops, the aircrew will select timing points based upon prominent terrain or topographical features. The para OP order will specify the locations(s) and exposure time.

(2) **Smoke**. When used, smoke must be set out near the code identifier in such a manner that it will not obscure the code letter. Smoke may also be displayed as a parachutist aid.

NOTE

During day and night ops, the malfunction of any type of pyrotechnic must be recorded by completing and submitting a CF-410 (Ammunition Defect, Malfunction Report and Disposal Request). (See Annex D).

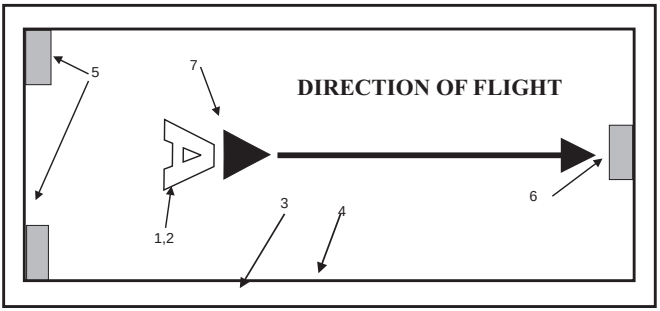


Legend;

1. Point of impact (PI);.
2. Code identifier (A, C, J, R, S).
3. Recommended 100 m safety zone.
4. DZ boundary.
5. Lead in panels (optional).
6. Trailing edge panels (optional).

Note:
1. Single point of impact (PI) is used by single ship or formation when all AC are dropping the same type of load.
2. Code identifier. size 1

Figure 1-1: Static-line DZ marking by night



Legend:

1. Point of impact (PI).
2. Code identifier (A, C, J, R, S).
3. Recommended 100 m safety zone.
4. DZ boundary.
5. Lead in panels (optional).
6. Trailing edge panels (optional).
7. Raised angle marker (RAM) (top of code identifier toward trailing edge).

Note:
1. Single point of impact (PI) is used by single ship or formation when all AC are dropping the same type of load.
2. Standard 0.6 m X 1.8 m recognition panels used to form code identifier.
3. Code identifier. size 14 m X 14 m (minimum 6 m X 6 m).
4. Lead in panels 300 m either side of DZ centre line (formation), 250 m either side single AC.
5. Point of impact (PI) location;:
   Personnel; - 10% of DZ or 300 m whichever is greater.
   Equipment; - 50% of DZ or 500 m whichever is less.

Figure 1-2: Static-line DZ marking by day option #1

49. On the layout for night ops, or under conditions of poor visibility, the minimum marking for a night DZ are:

a. leading edge lights;

b. code identifier lights; and

c. trailing edge lights.

50. Distances between the lights will vary, with the minimum size still being 6 m X 6 m.

51. The DZ “lead in” is indicated by one set of lights placed 300 m either side of the DZ centre line (formation drop); 250 m for single ship, and 300 m prior of the personnel PI or 500 m prior of the equipment PI.

52. Two lights must be placed at the trailing edge on the centre line.

53. Each timing marker point may consist of a green flashing or rotating beacon, and a white stationary vertical beam light clearly visible at drop altitude from a distance of 3 nm.

1. Vehicle lights, small fires, flare pots, flashlights, railroad flares, or the best local lighting available, will be used during night drop ops or during poor visibility.

2. Lights should be screened in forward areas to beam the light toward the flight path or sound of the approaching AC. This system must be well organized and timed to restrict illumination to the shortest possible period.

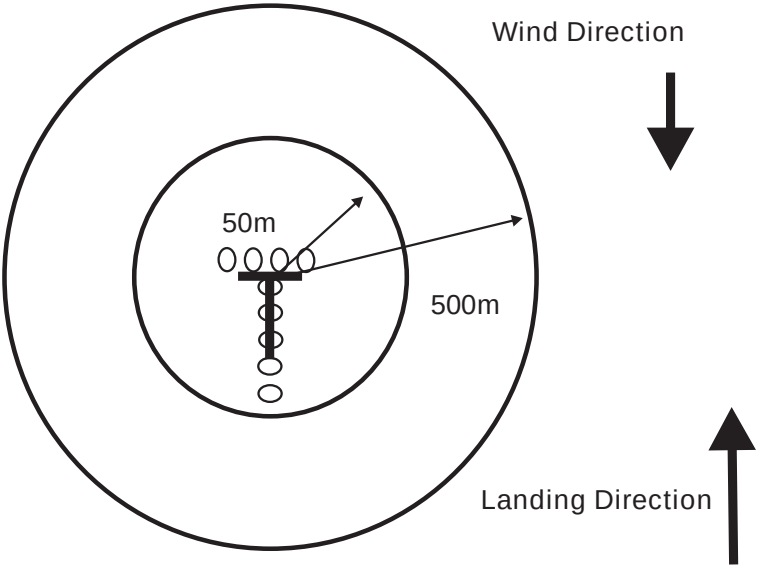


Figure 1-3: Military Freefall Parachuting DZ Marking Day and Night

1. The code identifier will be positioned in such a way that a freefall parachutist will be able to read it on final approach.

2. Normally a "T" will be used for MFP. However, the others could be used as long as coordination is done prior to jump.

3. Dimensions 50 m radius Personnel only
   500 m radius Cylinder

4. No less than 9 fuzees or lights will be used for a night drop.

5. During day operations, smoke and/or tell-tails and/or windsocks may be used to indicate the wind direction.

SECTION 5
WEATHER LIMITS

54. **Wind/Weather Limitations**. The following limitations are arbitrary, but are based upon experience and are not to be exceeded in training situations. Only after careful consideration of priorities

should a decision be made to exceed them under operational conditions, as the risk of personal injury increases significantly:

a. **Visibility**. The weather limits at the DZ are as follows for joint/continuation training:

(1) **Formation Day**:

(a) ceiling 1000 ft AGL; and

(b) visibility 3 mi.

(2) **Formation Night**:

(a) ceiling 1500 ft AGL; and

(b) visibility 3 mi.

(3) **Single Ship Day**:

(a) ceiling 800 ft AGL; and

(b) visibility 2 mi.

(4) **Single Ship Night**:

(a) ceiling 1000 ft AGL; and

(b) visibility 2 mi.

b. Maximum drop altitude winds for personnel and equipment using static line deployed parachute shall be 30 knots; however, for ops, maximum drop altitude winds can be increased to 40 knots at the discretion of the AB Force Comd. (Final decision by the AB Force Comd on drop altitude wind limits must be passed to the Formation/Aircraft Commander prior to his formation briefing). There is no altitude wind restriction for MFP.

55. Except for operational emergencies and special situations where the decision is left to the AB Force Comd, the maximum allowable surface winds are:

a. **Personnel**:

(1) Basic parachutist on their first jump—9 knots.

(2) Night parachuting—9 knots.

NOTE

Initial six descents to be done in daylight only. Following six descents, and upon instructor's approval, normal wind limits apply.

(3) CT-1 and CT-2 parachutes, other than as restricted above—13 knots.

(4) Wind gusts shall not exceed the maximum allowed wind speeds for a jump.

b. **MFP**:

(1) MFP students during first six descents—13 knots.

(2) MFP qualified personnel—daylight limit—18 knots.

(3) Night descents—13 knots.

NOTE

Wind gusts shall not exceed the maximum allowed wind speeds for a jump.

c. **Equipment**:

(1) LE/HE/CDS LIVE/DUMMY loads rigged with ground disconnect—18 knots.

(2) CDS/LE LIVE/DUMMY loads rigged without ground disconnect—13 knots.

56. **Monitoring of Wind**. Surface winds shall be monitored from the highest point on the DZ. Additional wind readings from more than one point on the DZ may be taken at the discretion of the AB Force Comd if circumstances warrant (e.g, unusually large DZs or very irregular topography).

57. **Wind Gusts**. DZ Controllers normally measure the wind speed at the highest point on the DZ. Ground contours and nearby terrain features may create varying wind speeds along the DZ. If a very long DZ with multiple PIs is used, considerations should be given to monitoring wind conditions at points along the DZ. The DZ Controller, based upon his briefing from the AB Force Comd, is the

deciding authority responsible for ordering a stop drop based upon wind conditions.

58. DZ winds are to be monitored from time of set-up of the DZ until the **GO.** The DZ Controller must assess the wind **trend** as P Hour approaches. A trend of incoming wind speeds accompanied by gusts over the limit is reasonable cause to order a stop drop.

59. Winds are to be monitored after the **GO** until the last jumper leaves the AC. If winds pick up, call a stop drop and go to an alternate plan.

60. A gust is defined as a violent, abrupt rush of wind. For the purposes of parachuting, a wind gust shall be deemed to exceed safety limits when the wind gust speed is above the normal wind speed allowed for the type of jump being conducted. When wind gust speed exceeds the limits described above, the DZ Controller will call a **STOP DROP**.

61. **As a rule**: Winds which repeatedly gust over the limits are a stop drop. Winds that do not gust over the limits are a clear to drop.

62. **Maximum Drop Altitude**:

a. Ram air and other high performance canopies when static-line deployed—the maximum exit altitude is determined by the capabilities of the parachutes and is currently set at 33,000 ft (10,000 m) above mean sea level (MSL).

b. CT-2 parachutes—5,000 ft (1524 m) above ground level (AGL).

c. CT-1 parachutes—2,000 ft (610 m) AGL.

d. **Basic Parachutist Training**:

(1) The first three descents, and the night jump—1250 ft (381 m) AGL.

(2) Subsequent descents—1,000 ft (305 m) AGL.

e. For continuation training, the normal altitude will be 1250 ft (381m) AGL; however, the AB Force Comd may authorize a jump of 1,000 ft (305 m) in order to meet a training requirement, or if weather conditions (e.g., ceiling or altitude winds) dictate.

Additionally, the CO CFLAWC or respective COs of Jump Companies may authorize a jump at 800 ft AGL during daylight. Parachuting below 800 ft AGL is restricted to ops, or training for special ops.

SECTION 6
AIR DROP MALFUNCTIONS

PERSONNEL PARA MALFUNCTIONS

63. **Airdrop Malfunction Report**. In order that the "Airdrop Malfunction Report—Form CF 1261" is properly completed, the following points will be noted and photographed. Investigation may disclose other items or points, which will require recording. Once completed, the "Airdrop Malfunction Report" will be processed as per CFTO C-22-010-020/TP-000.

a. **Parachutist**. Checked for:

(1) Canopy suspension lines and risers in relation to the parachutist's body.

(2) Note whether canopy or suspension lines appear to be caught around the feet, between the legs, under the arms, or around the quick release box.

(3) Note whether the parachutist is clutching any suspension lines or canopy in his hands.

(4) Riser or suspension line burn marks on the parachutist's helmet, clothing, boots or equipment.

(5) Distortion of harness, pack tray, reserve or equipment remaining attached to parachutist.

(6) Note the position of the weapon, snowshoes, radio set, rucksack or other equipment rigged on the parachutist.

(7) If the weapon, snowshoes, equipment, etc. appear to have been released, check for snagging or entanglement.

(8) Check the position of parachutist's body at impact area.

b. **Main Canopy**. Checked for:

(1) State of deployment.

(2) State of inflation.

(3) General layout of the canopy.

(4) Canopy caught on, or wrapped around the parachutist or equipment.

(5) Position of the harness, pack tray, and any related damage.

(6) Suspension lines or canopy caught in the harness, around quick the release box or canopy releases.

(7) Risers for twists and turns; canopy releases secured.

(8) Suspension lines tangled, or caught on the parachutist or equipment.

(9) Position of loose or suspect suspension lines.

(10) Position of static line if a separation is noted.

(11) Ensure the serial number of the main parachute is recorded.

c. **Reserve Canopy**. Checked for:

(1) State and position of the reserve on the harness.

(2) Was it activated?

(3) Did it deploy and inflate?

(4) Condition of the attachment to the harness and the position of the snap hooks.

(5) Relative position of the reserve canopy if activated.

(6) Check canopy for any sign of entanglement with main parachute.

(7) Pilot parachute and bridle cord will be checked and examined for any damage or abnormalities.

(8) Pack tray will be examined for damage or abnormalities.

(9) Position of suspension lines in relation to the main canopy, and if there is any sign of entanglement with main parachute, the parachutist or his equipment.

(10) If the reserve has been activated, a thorough search will be made in order that the ripcord handle can be recovered and examined.

(11) Ensure the serial number of the reserve parachute is recorded.

d. **Equipment**. Checked for:

(1) Was weapon, snowshoes, radio set, rucksack, or other equipment still rigged to the parachutist?

(2) Check the position and the rigging of this equipment.

(3) Did there appear to be any attempt to release or lower this equipment?

(4) If the release was **not** successful, how was the equipment set-up?

(5) Was the parachutist's equipment hooked, wrapped up or tangled with the canopies, suspension lines, or pilot parachute of the main and reserve parachutes?

(6) Check for any distortion of the parachutist's weapon and other equipment.

(7) Examine and record marks or line burns that could have been caused by riser or suspension lines.

e. **Military Freefall Parachute Malfunction**. The para rigger should carry out the investigation as indicated in the preceding sub-paragraphs, except that references to the static line and deployment bag do not apply. However, the following additional items should be included:

(1) The use, position, and functional serviceability of the ripcord handles of both the main and reserve parachutes will be checked.

(2) The ripcord pins, cable and cones, eyelets, grommets and pack opening bands will be examined and checked.

(3) The altimeter and stopwatch will be checked, and the position of the dials recorded before removal from the parachutist.

(4) Note will be made of the type of goggles/oxygen mask (if any) that was worn by the parachutist, and the method of attachment.

(5) Note the position of the blank gores and steering lines in relation to any observed abnormalities.

(6) Check the canopy sleeve, pilot parachute, bridle cord, and the sleeve retaining line for damage or abnormalities.

(7) The automatic opening device must be examined to ascertain if it was actuated and if it functioned correctly.

(8) Ensure the serial numbers of the altimeter and the automatic opening device are recorded.

EQUIPMENT PARA MALFUNCTIONS

64. **Malfunction Phases**. Cargo airdrop malfunctions should be categorized by the phase in which the malfunction occurred. This will

save time and eliminate wasted effort by restricting the investigation to those factors that could have caused or contributed to the malfunction. Following is a list of the phases and the points within the phases that should be checked. These are not all-inclusive and should be used only as general guides. The investigation may disclose other items, which should be checked:

a. **Aircraft Phase**. Includes the time from actuation of the air delivery system until the extraction force has been initiated.

b. **Extraction Phase**. Includes the time from the start of the extraction force until the transfer of the extraction force to deployment of the recovery parachute(s).

c. **Deployment Phase**. Includes the time from the transfer of the extraction force to the deployment of the recovery parachute(s), and continues until ground impact.

d. **Release Phase**. This phase necessarily overlaps the deployment phase, but concerns only the functioning of the parachute ground release assemblies. It commences when the time delay cartridge should have been actuated, and continues until ground impact when the parachute release does or does not occur.

65. The following points should be checked within the relative phases:

a. **Aircraft Phase**. This information must be made available to the para rigger prior to the finalisation of his investigation:

(1) Premature extraction:

(a) Check the operating condition of the dual-rail system.

(b) Was the correct detent latch-restraint set for the load?

(c) Did the bomb shackle release prematurely?

(d) Was the extraction parachute correctly installed?

(e) Were all the A/C pre-loading checks completed (including airdrop joint inspection checks)?

(f) Were the dual rail latches tested before the A/C was loaded?

(g) Was the safety line installed?

(h) Was the weight of the load the same as the weight manifested?

(i) What weight was used to adjust the tension on the right hand latches?

(2) Failure or relay in the load extraction:

(a) Check the operating condition of the dual-rail system.

(b) Was correct detent latch-restraint set for the load?

(c) Was there an electrical failure on the aerial delivery system?

(d) Were the correct in-flight procedures followed by each crewmember?

(e) Check for platform damage, which may have retarded movement.

(f) Did the load team encounter any difficulties in placing the platform in the AC?

(g) For multiple loads, was a 20-foot extension line attached to the extraction line?

(h) Did the extraction parachute fully deploy?

(i) Were the detents aft of the platform pinned out?

(j) Was the proper extraction parachute used?

b. **Extraction Phase**:

(1) Failure of the extraction parachute to deploy:

(a) Were the closing ties made correctly and with the proper cord?

(b) Was the safety cord free from behind the bent V-ring?

(c) Was the correct reefing line used and properly installed?

(2) Failure to transfer the extraction force to deployment:

(a) Were static lines hooked to anchor line cables?

(b) Was the connector strap threaded through the knives on the static line?

(c) Was the proper connector strap correctly installed on the Type IV link assembly?

(d) Was the connector strap cut?

(e) Did the connector strap unwind from the extraction clevis and attaching point clevis?

(f) Was the extraction line mis-routed?

c. **Deployment Phase**:

(1) Failure of the recovery parachute(s) to deploy:

(a) Was the deployment line attached to the extraction clevis and parachute(s)?

(b) Was the deployment line mis-routed?

(c) Were the parachute restraint and release straps properly attached?

(2) Failure of the suspension system:

(a) Did the load suspension point fail?

(b) Did the suspension slings fail?

(c) Were the suspension slings attached to the load or the platform correctly?

(d) Were the suspension slings routed to the suspension points correctly?

(e) Was protective padding used where needed?

(3) Failure of the recovery parachutes to fully inflate:

(a) Were the reefing line releases re-armed?

(b) Were the reefing line releases activated?

(c) Did the reefing line release?

(d) Was the reefing line entangled in reefing rings or suspension lines?

(e) Did all/any parachutes fail to deploy?

(f) Was there any damage to the parachutes?

(g) Were the riser extensions correctly attached?

d. **Release Phase**:

(1) Mid-air release:

(a) Was a premature actuation of the release indicated during parachute deployment?

(b) Was the release properly attached to the parachute and load?

(c) Was there indication of a failure to attain the minimum load condition(5000 lbs release assembly)?

(d) Check for a faulty release pin (5,000 lbs release assembly).

(e) Check the type of release used.

(f) Did the load release prior to deployment of the parachutes?

(2) Failure to disconnect:

(a) Did the time delay cartridge fire (5,000 lbs release assembly)?

(b) Did a "no-load" condition occur on impact? (See Annex B for CF 1261 Airdrop Malfunction Report)

SECTION 7
IDENTIFICATION OF AIRDROPPED SUPPLIES

GENERAL

66. To speed the recovery of containers and platform loads in their correct order of priority, and to assist in the sorting of commodities, each individual load may be marked with an identifying colour in accordance with the authorized colour code.

67. **Load Marking**. The following colour code will be used on the outside surface of aerial delivery containers or platforms to give a general indication of the type of stores delivered. Where composite loads are airdropped, they will be marked with a colour representing the highest priority material in that load:

a. RED—ammunition and weapons.

b. BLUE—fuel and lubricants.

c. GREEN—rations and water.

d. YELLOW—communications equipment.

e. RED CROSS on white background—medical supplies.

f. BLACK and WHITE stripes (alternate)—mail.

68. **Size Of Marking**. The above colours may be indicated by any suitable means (paint, chalk, paper, cloth, etc.). No particular size is required, but it must be possible to identify the markings at a minimum distance of 200 m. Marking will be applied on all four sides of the load.

69. **Lights Marking**. When lights are used for the identification of supplies dropped by night, they should be coloured to conform to the colour code defined above.

70. **Special Markings**. All other types of stores will have no special markings. It is not intended that these colours shall conflict or interfere with specific NATO or national markings, which may indicate details of the types of ammunition, medical supplies, etc., or to restrict of the type of ammunition, medical supplies, etc., or to restrict the use of the additional markings for more detailed identification.

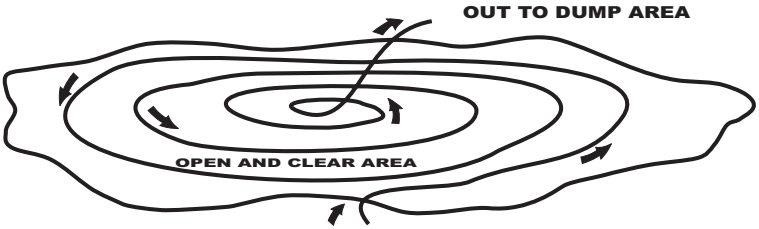
71. During an op, for night and/or day drop, the load markings might have to be done for each condition (colour/lights) in the event that the recovery is delayed due to unforeseen circumstances.

SECTION 8
DROP ZONE CLEARANCE

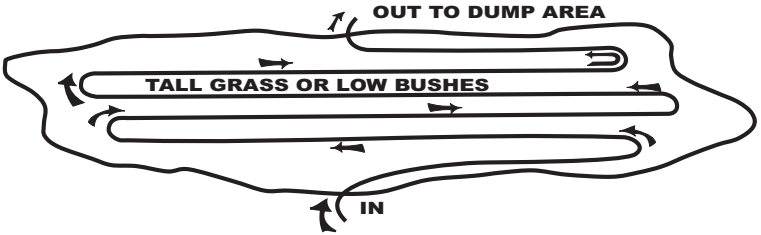
GENERAL

72. The actual method of clearing DZs of dropped stores will depend upon the terrain. There are three methods, each of which is best suited to a particular ground condition. These methods are:

a. Whirl Method.



b. Strip Method.



c. Sector Method.

SECTION 9
DZ CONTOLLER AIRCREW BRIEFING

73. The following points will be covered during DZ briefings as part of the concept briefing:

a. **DZ Description**:

(1) DZ name.

(2) DZ size.

(3) DZ axis in degrees magnetic, with zero (0) declination set on compass.

(4) Air-ground-air frequencies.

(5) Highest elevation.

(6) PI location (and letter used, along with any special markings).

(7) Description of hazards.

(8) Special instructions.

(9) Any restrictions.

(10) Method for relaying drop score (if required).

SECTION 10

74. **Drop Zone Information Check List**:

a. Proposed name of DZ.

b. Survey map reference and sheet number.

c. Coordinates / latitude and longitude of DZ centre.

d. **Height of**:

(1) PI (ft above MSL); and

(2) highest point of DZ (ft above MSL).

e. Coordinates of DZ given in a minimum of 8 figure grid reference for the four corners and any PI(s).

f. **Dimensions**:

(1) usable length (m); and

(2) usable width (m).

g. Recommended run-in/run-out track in degrees with a zero (0) declination set on compass.

h. Recommended target approach point (TAP) and/or initial point of impact (PI).

i. Recommended alternate run-in/run-out tracks.

j. Recommended alternative TAP and/or PI.

k. **Location and description of obstructions, hazards and water areas**:

(1) within DZ; and

(2) within 1 nm (1.84 km) radius of DZ.

l. Access road facilities.

m. **Comment on suitability for**:

(1) personnel drops;

(2) platform drops;

(3) supply drops; and

(4) combined personnel/platforms/supply drops.

n. Recommended maximum stick lengths.

o. **Peacetime considerations**:

(1) Facilities:

(a) nearest civil/military airfield for diversion/emergencies;

(b) nearest civilian/military hospital;

(c) communications; and

(d) meteorological.

(2) Restrictions within TAP/PI radius of DZ:

(a) active airfields/airways;

(b) active danger areas;

(c) restricted/prohibited areas;

(d) whether civilian or military area; and

(e) whether cleared by civilian authority for military use.

p. General remarks (e.g., undershoot/overshoot areas, whether life jackets should be worn, etc.).

NOTE

A detailed sketch map and/or large-scale photograph of the DZ and surrounding area shall be attached.

75. Physical reconnaissance carried out.

Date: _____ Signature: _____

Unit: _____ Rank and Name: _____
(See Annex A)

SECTION 11
DUTIES OF PARACHUTE RIGGER

76. To provide the DZ Controller with technical advice on the ground recovery of parachutes and associated airdrop equipment.

77. In the event of a parachute/airdrop malfunction, complete the CF 1261 Airdrop Malfunction Report in accordance with C-22-010-020/TP-000. (See Annex B)

NOTE

If a parachutist is injured, first aid must be administered immediately. When a MO/MedA removes the harness from the parachutist, ensure the parachute is disturbed as little as possible. It is important to take photographs of the parachutist before he is removed from the harness.

78. To ensure photographs are taken of any malfunction prior to parachutist or equipment being moved or disturbed. See Note.

SECTION 12

79. **Duties of the Drop Zone Clearance Team**:

a. Operate vehicles assigned to the mission in a safe manner.

b. Clearance, recovery, security and transportation of all airdropped stores and equipment from the DZ in accordance with instructions given by the DZ Controller.

c. During exit, flight and landing, observe the parachutists and/or equipment for any unusual events or injuries, and inform the DZ Controller accordingly.

d. Assist the DZ Controller in setting-up and closing-down the DZ as required. Vehicles assigned to this task must be parked outside the DZ perimeter so they do not present a hazard during the airdrop of personnel and loads.

80. **De-Rigging Of Loads**:

a. **Containers**. The following sequence is to be followed for de-rigging containers:

(1) Remove and field-roll cargo parachutes.

(2) Unpack the container and prepare the container components for backloading.

b. **Platform Loads**. The following sequence is to be followed for de-rigging platform loads:

(1) Remove and field-roll the extraction and cargo chutes.

(2) Remove the suspension group.

(3) Remove the tie-down group.

(4) Remove the load and/or accompanying load from the platform.

(5) Remove the honeycomb from the platform (this may be done prior to removal of the load).

(6) Remove all miscellaneous items.

(7) Prepare all airdrop equipment for backloading.

81. **Recovery Priorities**. Airdrop rigging equipment should be recovered and backloaded in the following priority:

a. personnel parachutes;

b. cargo and extraction parachutes;

c. airdrop containers;

d. airdrop platforms; and

e. other related airdrop rigging equipment.

82. **Temporary Field Storage of Airdrop Equipment**:

a. **Parachutes**. The following should be considered when determining the proper field storage facilities devised for parachutes:

(1) a dry area;

(2) out of direct sunlight;

(3) free of contact with the ground;

(4) in a central assembly area;

(5) in stacks segregated by types if possible, store wet and dry chutes in separate stacks;

(6) under camouflage to protect against detection;

(7) under guard to prevent sabotage; and

(8) areas free from acids and flammable liquids.

b. **Containers, Platforms and Airdrop Hardware**:

(1) Airdrop platforms should be stored on dunnage to prevent deterioration.

(2) Webbing should be protected from excessive moisture, and nylon webbing should be shielded from direct sunlight.

(3) Hardware should be protected from excessive moisture. A protective cover should be placed over hardware wherever possible.

(4) The canvas used with airdrop containers and platforms is usually mildew/water resistant cotton duck, and may be used to cover the more critical items of recovered airdrop equipment.

(5) Parachute release assemblies and load couplers should be carefully placed in boxes so that the mechanisms are not damaged, and stored in an area that is free of moisture.

SECTION 13
DUTIES OF THE MEDICAL OFFICER/ASSISTANT

83. Ensure adequate first aid treatment kits are carried/transported.

84. Provide immediate first aid to injured parachutists.

85. During exit, flight and landings, observe the parachutists, and as directed by the DZ Controller, stand by for immediate dispatch to the scene in the event of an injury.

86. Ensure the driver of the ambulance remains in the vehicle with the engine running and the radio operating.

87. Ensure the ambulance driver remains in voice communication with the DZ Controller at all times.

NOTES

1. The MO/MedA will decide when injured personnel are to be taken to hospital for treatment.

2. The MO/MedA must advise the DZ Controller prior to evacuating injured personnel.

3. In the event the MO/MedA evacuates injured personnel to a hospital, parachuting will cease until adequate medical coverage is resumed to the satisfaction of the DZ Controller.

4. If a MedA is providing the DZ coverage, a MO must be within 20 minutes of the DZ. B-GL-381-000/TS-000 refers.

SECTION 14
DUTIES OF THE DROP ZONE COMMUNICATOR

88. Ensure adequate and serviceable communications equipment is available for the specific task (e.g., UHF/VHF, etc.).

89. Ensure adequate back-up communications equipment is available.

90. Establish and maintain air-ground-air communications with the A/C involved in the op; be aware of the respective call signs and type of drop.

91. Ensure the transmission of wind direction/speed (knots) to the AC. All pertinent transmissions must be verified by the DZ Controller.

92. Remain in voice communications with the DZ Controller at all times.

93. Assist the DZ Controller in setting-up the DZ as required.

94. During exit, flight and landings, observe the parachutists and/or equipment for any unusual events or injuries, and advise the DZ Controller accordingly.

SECTION 15
DROP ZONE SAFETY

95. In the event of a complete/major malfunction resulting in serious injury or death, or for any other significant unusual occurrence, the duties of the DZ Controller are detailed below:

a. **Para Drop**:

(1) Order **STOP DROP** if in his judgement the malfunction will endanger oncoming parachutists, or impede the ability to render immediate first aid to a seriously injured parachutist(s). See Note.

(2) Dispatch the MO/MedA to the scene when all parachutists have landed.

(3) Dispatch the para rigger to the scene when all parachutists have landed.

(4) Quarantine all equipment involved in the malfunction, and post guards to ensure the equipment is not disturbed pending initial investigation/photographs by para rigger. See Note.

(5) Inform the Formation/Aircraft Commander so that the deployment bags will be left on the anchor line cable after static lines have been retrieved.

(6) Locate, mark, record, and if necessary, guard other associated evidence relating to the incident.

NOTE

If a parachutist is injured, first aid must be administered immediately. When an MO/MedA removes the harness from the parachutist, ensure the parachute is disturbed as little as possible. It is important for photographs to be taken of the parachutist before he is removed from the harness.

(7) Identify and segregate witnesses, and attempt to obtain preliminary statements.

(8) Inform the AB Force Comd, the senior passenger and the local ground commander of the incident and action taken.

(9) Obtain all applicable documentation (e.g., manifest) to assist the para rigger in the completion of the initial investigation.

(10) In the event of a fatality, ensure that the body and personnel equipment are not disturbed until:

(a) The para rigger has conducted his initial investigation and taken all necessary photographs.

(b) A provincial coroner, or an MO so delegated by a provincial coroner, has completed his investigation and orders the removal of the body.

(11) As directed, make himself available during any subsequent investigation.

b. **Equipment Drop**:

(1) Order **STOP DROP** if in his judgement the malfunction or its affects will endanger oncoming parachutists. See Note.

(2) Dispatch the para rigger to the scene when all airdropped loads have landed. When the para rigger arrives at the scene, and prior to taking any action, he will determine the contents of the load and advise the DZ Controller whether there is dangerous cargo requiring special precautions/handling (e.g., explosive ordnance disposal [EOD] firefighters, guards).

(3) Upon determining the load “safe,” order the para rigger to commence his initial investigation/photography.

(4) Quarantine all equipment involved in the malfunction, and post guards if necessary, to ensure the equipment is not disturbed pending initial investigation/photographs by para rigger.

(5) Advise the Formation/Aircraft Commander to enable them to initiate reports/investigations are required.

(6) Locate, mark, record, and if necessary, guard other associated evidence relating to the incident.

(7) Identify and segregate witnesses, and attempt to obtain preliminary statements.

(8) Inform the AB Force Comd, the senior passenger and the local ground commander of the incident and action taken.

(9) Obtain all applicable documentation (e.g., Airdrop Joint Inspection Form) and assist the para rigger in completion of the initial investigation/photography.

NOTE

In order to transmit/receive pertinent information or instructions relating to the incident, the DZ Controller must maintain voice communication at all times with the land and air units involved in the op/exercise.

(10) When ordered by an appropriate authority, supervise the tagging, collection and packaging of all evidence.

(11) Once all initial investigations/photographs have been completed, direct the DZ clearance party to remove the load to an area specified by a responsible authority.

(12) Issue strict orders to ensure that the evidence is not disturbed as specified in Part 11 prior to detailed examination by an appropriate authority.

(13) As directed, make himself available during any subsequent investigation.

96. In the event of complete/major malfunction resulting in serious injury or death, or for any other significant unusual occurrence, the para rigger's initial investigation shall be carried out in accordance with the following publications and orders:

a. CFTO C-22-010-020/TP-OOO;

b. CFPMD *Parachute Riggers Handbook*; and

c. Applicable Unit SOP.

SECTION 16
DZ CONTROLLER CURRENCY

97. IAW LFCO 22-2, once qualified, DZ Controllers must only re-read the applicable regulations/orders and this manual in order to refresh themselves.

98. While this guideline may offer the minimum acceptable standard, it is recommended that units refresh their DZ Controllers through symposia and by having a "stale" DZ Controller understudy a "current" DZ Controller prior to assuming active Controller duties.

99. Unit SOP may specify DZ Controller currency (e.g., to be current a DZ Controller must have controlled a DZ within the past 12 months).

8	Drop Zone (DZ) or Landing Zone (LZ) Controller— AGMD	Prior to each performance of DZ/ LZ Controller duties, personnel qualified AGMD will certify that they have read and understood LFCO 22-2, Unit SOP on DZ / LZ Operations, Range Standing Orders and the CFLAWC DZ/LZ Controller's Handbook**.**

Ref: LFCO 22-2, Annex C

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ANNEX A
LAND ADVANCED WARFARE CENTRE

<table>
<tr><td>1. DZ Name or Call Sign</td><td>2. Location of DZ Centre
a. Latitude
b. Longitude</td><td colspan="2">3. Map Series (Sheet and Number, Nad and Zone) (E.G., A751 Map 31 C/3 Ed 8, Nad 83, Up Zone 18t)</td></tr>
<tr><td colspan="2">4. Dimensions

a. Length in M
b. Width In M</td><td colspan="2">5. Dz Corners In 8 Figure Grid References
NW NE SW SE</td></tr>
<tr><td>6. Approach Axis

Degree Magnetic</td><td colspan="2">7. Location of Point of Impact (8 Figure Grid References)

Personnel
Equipment</td><td>8. Maximum Stick Length</td></tr>
<tr><td colspan="3">9. Elevation (Ft Above Sea Level)

A. PI Personnel B. PI Equipment
C. Highest Point on DZ</td><td>10. Aerial Photo Available</td></tr>
<tr><td colspan="4">11. Special Instructions

a. ATC Restrictions c. Land Clearance

b. LPU Mandatory d. Other</td></tr>
<tr><td colspan="4">12. Description of Hazards/Obstacles Within 1 Nautical Mile (1.84 km) of DZ and Recommendations of Officer/NCO Conducting Recce</td></tr>
<tr><td colspan="4">13. Sketch or Map of DZ Area

See Attached Copy</td></tr>
<tr><td>14. Recce Conducted By</td><td>15. Date Recce Conducted</td><td>16. Requesting / User Unit</td><td>17. Approved By

(Name, Rank, Position) (Date)</td></tr>
<tr><td colspan="4">Distribution: Airborne Force Commander = 1 DZ Controller = 1

Airlift Commander = 1 8 Wing Trenton A3 Plans = 1
Requesting/User Unit = 1</td></tr>
</table>

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ANNEX B
AIRDROP MALFUNCION/INCIDENT REPORT

PART 1 -GENERAL

1. UNIT MALFUNCTION/INCIDENT REPORT NO.	2. UNIT	3. EXERCISE NAME	
4. DZ NAME AND/OR LOCATION	5. DZ ELEVATION	6. DATE & TIME	
7. DROP ALTITUDE (FT AGL)	8. VISIBILITY	9. WIND (KNOTS)	AT ALTITUDE SURFACE
10. TYPE OF AIRCRAFT- AIRCRAFT NUMBER – SQUADRON- POSITION in FORMATION- PASS NO- CHALK NO			
11. AIRCRAFT FLAP SETTING	12. AIRCRAFT SPEED (KNOTS)		

PART II -PERSONNEL

13. PRI/SN-RANK-NAME-UNIT –NO OF DESCENTS (INDIVIDUAL)	14. JUMPERS POSITION IN AIRCRAFT	
15. EQUIPMENT WORN/CARRIED BY JUMPER		
16. TYPE OF PARACHUTE - SERIAL NO.	17. TYPE OF RESERVE - SERIAL NO.	18. RESERVE ACTIVATED **NO** RESERVE FUNCTIONED PROPERLY **NO**
19. TYPE OF MALFUNCTION -	DESCRIPTION	
20. RESULTING INJURY -	DESCRIPTION OF INJURY	

PART III -CARGO

21.AIRDROP SYSTEM -	22.TYPE OF PLATFORM/CONTAINER -	23. WEIGHT OF LOAD	24. POSITION IN AIRCRAFT
25. TYPE OF PARACHUTE -	QUANTITY	SERIAL NO.	
26. SIZE OF EXTRACTION PARACHUTE -	SERIAL NO.	27. PHASE MALFUNCTION/INCIDENT OCCURRED -	
28. AIRDROP LOAD	29. RIGGING INSTRUCTIONS USED	30. RIGGING UNIT	

PART 4 -SUMMARY

31. DESCRIPTION OF MALFUNCTION/INCIDENT AND DAMAGE INCURRED		
32. CAUSE OF MALFUNCTION/INCIDENT		
33. PRI/SN-RANK-NAME-UNIT OF WITNESSES		
34. RANK-NAME-UNIT OF INVESTIGATING OFFICER	35. SIGNATURE	36. CPC CONTROL NO.

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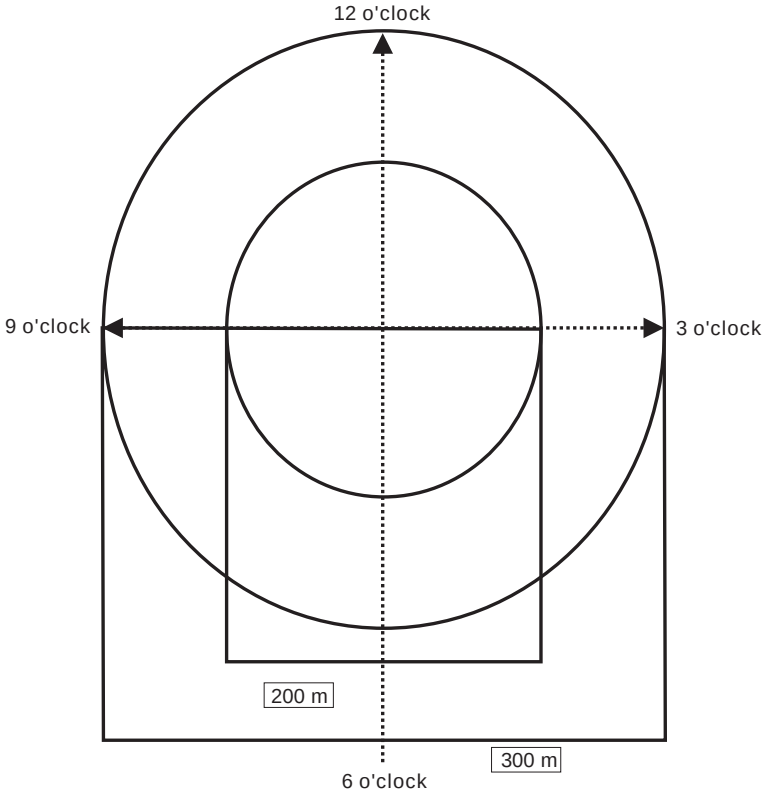
ANNEX C
DROP SCORE

50 METRES AROUND PI WILL BE CALLED A BULLSEYE



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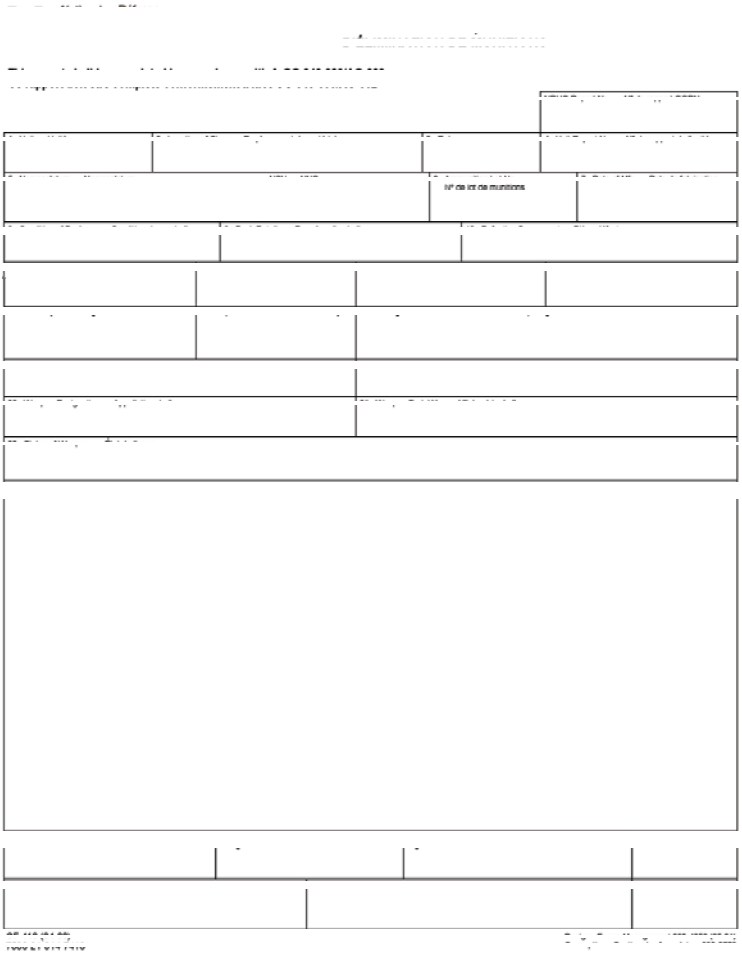
ANNEX D
AMMUNITION DEFECT, MALFUNTION REPORT AND DISPOSAL REQUEST



24 CFB, Operational Unit Commanders or Formation HQ Use Only – Réservé à la BFC, au Commandant de l'unité opérationnelle ou au QG de la formation

Name of Technical Officer Nom de l'officier technicien	Technical Officer Designation Désignation de l'officier technicien	Signature of Technical Officer Signature de l'officier technicien	Date
Name of Commanding Officer Nom du Commandant	Signature of Commanding Officer Signature du Commandant		Date

25 Command Headquarters Use Only – Réservé au quartier général du commandement

Name of Technical Officer Nom de l'officier technicien	Technical Officer Designation Désignation de l'officier technicien	Signature of Technical Officer Signature de l'officier technicien	Date
Name of Delegated Officer Nom de l'officier délégué	Delegated Officer Designation Désignation de l'officier délégué	Signature of Delegated Officer Signature de l'officier délégué	Date

26 NDHQ Use Only – Réservé au QGDN

This report has been reviewed and a decision is provided as follows.
Ce rapport a été examiné et la décision est la suivante

☐ Disposed of in accordance with C-09-008-001/FP-000 Éliminé selon la C-09-008-001/FP-000	CF 152, Write-off Report Submission CF 152, Rapport de radiation	☐ Is required Est requis	☐ Is not required N'est pas requis

Remarks – Remarques

Name of Delegated Officer Nom de l'officier délégué	Delegated Officer Designation Désignation de l'officier délégué	Signature of Delegated Officer Signature de l'officier délégué	Date

27 Work Order No. – N° de la demande de travaux	28 CF Supply Document No – N° du document d'approvisionnement

ANNEX E
DZ INFO SHEET

LAND ADVANCED WARFARE CENTRE
DZ INFO SHEET

DATE	TIME	CALL SIGN	LIFT #	ALTITUDE	WIND DIRECTION	WIND SPEED	STEADY OR GUST	TEMPERATURE

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ANNEX F
PERMISSION TO USE NON DND PROPERTY

National Défense / Defence nationale

PERMISSION TO USE NON DND PROPERTY

I

NAME	ADDRESS	PHONE NUMBER	DATE

Hereby agree to grant authority to the Minister of National Defence, represented by:

SN	Rank	Name	Unit	Posn	Phone

To use my property / the property I am responsible for from:

Hour		Day		Month		Year	
To							
Hour		Day		Month		Year	

1. Description of Property (Diagrams, boundaries, lot number, concession, etc.):

2. Description of Intended Use (what DND will do on the property, in detail):

3. Condition of Property (note physical defects or legal problems) on:

4. Restrictions on use of my Property:

a. Cutting ☐	b. Digging ☐
c. Routes	
d. Times of movements	
e. Size of vehicles	
f. Operation of equip/generators	
g. Other	

5. It is understood and agreed that use of my property during the above mentioned period will be free of any charge and subject to my right to claim reimbursement from the Minister of National Defence for damages which may result from such use of my property, fair weather and tear excepted.

Name (of DND member)	Name (of owner/manager/authorized Rep)
Signature (of DND member)	Signature (of owner/manager/authorized Rep)
Address	Address

Date:

Distribution

Copy 1 Owner/Manager/Representative

Copy 2 User

Copy 3 OIC MRC

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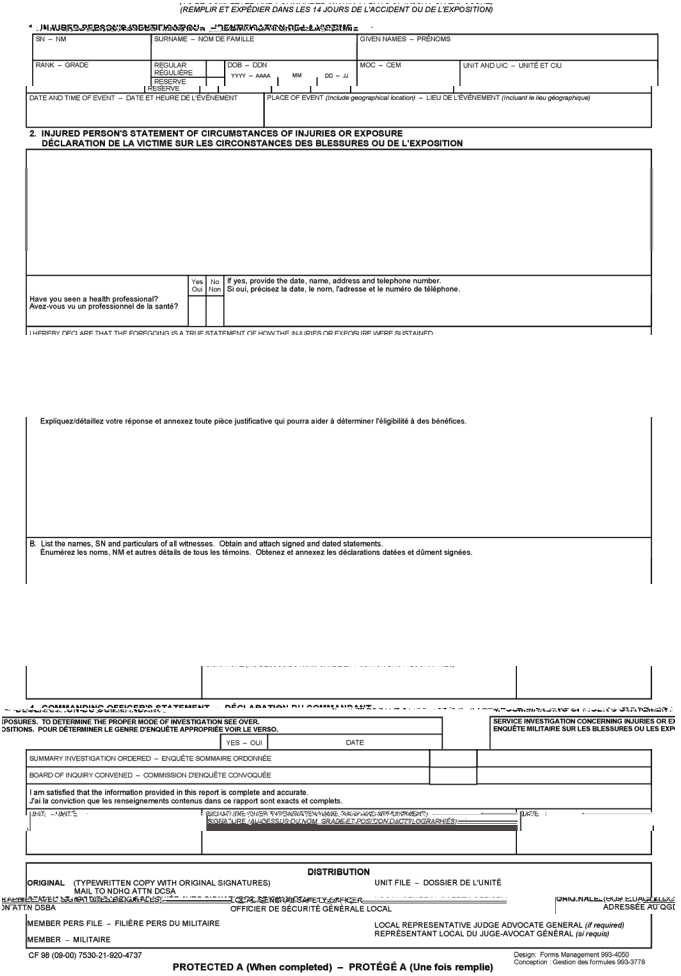
ANNEX G
REPORT ON INJURIES OR EXPOSURE TO TOXIC MATERIAL



(REMPLIR ET EXPÉDIER DANS LES 14 JOURS DE L'ACCIDENT OU DE L'EXPOSITION)

SN – NM | SURNAME – NOM DE FAMILLE | GIVEN NAMES – PRÉNOMS

RANK – GRADE | REGULAR / RÉGULIÈRE / RESERVE / RÉSERVE | DOB – DDN YYYY – AAAA MM DD – JJ | MOC – CEM | UNIT AND UIC – UNITÉ ET CIU

DATE AND TIME OF EVENT – DATE ET HEURE DE L'ÉVÉNEMENT | PLACE OF EVENT *(Include geographical location)* – LIEU DE L'ÉVÉNEMENT *(Incluant le lieu géographique)*

2. INJURED PERSON'S STATEMENT OF CIRCUMSTANCES OF INJURIES OR EXPOSURE
DÉCLARATION DE LA VICTIME SUR LES CIRCONSTANCES DES BLESSURES OU DE L'EXPOSITION

Have you seen a health professional? / Avez-vous vu un professionnel de la santé? — Yes / Oui — No / Non

If yes, provide the date, name, address and telephone number. / Si oui, précisez la date, le nom, l'adresse et le numéro de téléphone.

I HEREBY DECLARE THAT THE FOREGOING IS A TRUE STATEMENT OF HOW THE INJURIES OR EXPOSURE WERE SUSTAINED

Expliquez/détaillez votre réponse et annexez toute pièce justificative qui pourra aider à déterminer l'éligibilité à des bénéfices.

B. List the names, SN and particulars of all witnesses. Obtain and attach signed and dated statements.
Énumérez les noms, NM et autres détails de tous les témoins. Obtenez et annexez les déclarations datées et dûment signées.

4. COMMANDING OFFICER'S STATEMENT – DÉCLARATION DU COMMANDANT

IPOSURES. TO DETERMINE THE PROPER MODE OF INVESTIGATION SEE OVER.
OSITIONS. POUR DÉTERMINER LE GENRE D'ENQUÊTE APPROPRIÉE VOIR LE VERSO.

SERVICE INVESTIGATION CONCERNING INJURIES OR E
ENQUÊTE MILITAIRE SUR LES BLESSURES OU LES EXP

YES – OUI | DATE

SUMMARY INVESTIGATION ORDERED – ENQUÊTE SOMMAIRE ORDONNÉE

BOARD OF INQUIRY CONVENED – COMMISSION D'ENQUÊTE CONVOQUÉE

I am satisfied that the information provided in this report is complete and accurate.
J'ai la conviction que les renseignements contenus dans ce rapport sont exacts et complets.

RANK – GRADE | SIGNATURE (PLEASE TYPE/PRINT NAME, RANK AND APPOINTMENT) / SIGNATURE (VEUILLEZ DACTYLOGRAPHIER/NOM, GRADE ET POSTE/CONDUCTEUR) | DATE

DISTRIBUTION

ORIGINAL (TYPEWRITTEN COPY WITH ORIGINAL SIGNATURES) — MAIL TO NDHQ ATTN DCSA

UNIT FILE – DOSSIER DE L'UNITÉ

ATTN DSBA

OFFICIER DE SÉCURITÉ GÉNÉRALE LOCAL

ADRESSÉE AU QGD

MEMBER PERS FILE – FILIÈRE PERS DU MILITAIRE

MEMBER – MILITAIRE

LOCAL REPRESENTATIVE JUDGE ADVOCATE GENERAL *(if required)*
REPRÉSENTANT LOCAL DU JUGE-AVOCAT GÉNÉRAL *(si requis)*

CF 98 (09-00) 7530-21-920-4737

Design: Forms Management 993-4050
Conception : Gestion des formules 993-3778

PROTECTED A (When completed) – PROTÉGÉ A (Une fois remplie)

INSTRUCTIONS FOR COMPLETION OF FORM CF 98

GENERAL INFORMATION

A CF 98 shall be completed for all injuries and all exposure or suspected exposure to toxic substances or material. An injury such as a sprain, for example, may be a factor in a future more serious medical condition. Ensure that statements made by injured/exposed persons and witnesses are:

- in the first person;
- in their own words;
- brief, but contain details of the circumstances under which the injury was sustained; and
- signed and dated by the person making the statement.

Where it is necessary to submit a statement of a witness, the CO shall detail an officer other than the supervisor to obtain the statement.

SECTION 1

Ensure that all information required is provided.

SECTION 2

Ensure that SECTION 2 is completed by the injured member, however, if the injured member is unable to make a statement, the report shall be submitted and a statement obtained and forwarded as soon as possible.

Health professional means any person qualified and authorized to give care (physicians, nurses, medical assistant, chiropractor, etc.).

If a member is seen by a health professional that is not employed by the CF, then the member should request that a copy of the professional report be sent to his supporting medical unit. This may require that the member sign an authorization for the disclosure of medical information.

SECTION 3

The CO has the responsibility [illegible] adequately documented for future use [illegible] an officer should be designated [illegible] may be designated.

3A This section should be completed in as much detail as possible so as to clarify whether the injury or the exposure arose out of or was directly connected to military service. Substantiating documentation (CF Expres form, routine orders, unit physical training program, team list, CO's orders and directives, etc.) shall be attached.

3B Provide witnesses' personal information in as much detail as possible. Such identification is essential should it be necessary to obtain further statements from witnesses especially when required long after the event. It is important that witnesses' statements be attached (if applicable). However, it is not necessary to attach the statement of every witness to the injury. Be selective and include only the key witnesses' statements that will add to the validity of the CF 98.

SECTION 4

The CO or an officer designated by the CO (rank of Capt/Lt(N) or above) shall complete this section. A board of inquiry should be convened if the circumstances surrounding the injury are such that a detailed and formal investigation is warranted. If a board of inquiry is not convened, a summary investigation shall be ordered if the injury requires hospitalization for more than 24 hours, is of such severity that there is cause for immediate concern for the health of the member, whether the member's life is in danger or not, is likely to cause permanent disability, or in cases where compensation for disability – Reserve Force is considered payable. It should be considered if there is any doubt about the permanency of the injury.

INSTRUCTIONS POUR REMPLIR LE FORMULAIRE CF 98

RENSEIGNEMENTS GÉNÉRAUX

Il faut remplir un CF 98 dans tous les cas de blessure ou d'exposition réelle ou soupçonnée à une substance ou du matériel toxique. Toute blessure (une entorse, par exemple) peut devenir ultérieurement l'élément d'un problème médical plus sérieux. Les déclarations de la victime et des témoins doivent être :

- rédigées à la première personne;
- rédigées dans ses propres mots;
- brèves, tout en comportant des détails précis sur les circonstances de la blessure;
- signées et datées par la victime ou le témoin.

Lorsqu'il est nécessaire de soumettre la déclaration d'un témoin, le commandant désignera un officier autre que le superviseur pour obtenir cette déclaration.

SECTION 1

Veillez à ce que tous les renseignements requis soient fournis.

SECTION 2

Veillez à ce que la SECTION 2 soit remplie par la victime. Cependant, si la victime n'est pas en mesure de faire une déclaration, le rapport doit être soumis et une déclaration obtenue et acheminée dès que possible.

Par professionnel de la santé, on entend une personne qualifiée et autorisée à prodiguer des soins (médecins, infirmiers ou infirmières, adjoints médicaux, chiropraticiens, etc.).

Si le militaire est vu par un professionnel de la santé qui n'est pas au service des FC, le militaire devrait demander qu'une copie du rapport médical soit envoyée à son unité médicale de soutien. On pourra demander au militaire de signer un formulaire autorisant la communication de renseignements médicaux.

SECTION 3

Le commandant a la responsabilité de s'assurer que les cas de blessures/d'expositions soient documentés adéquatement en vue d'un usage futur par les FC ou le militaire. Le commandant désignera un officier pour remplir la section 3 (un officier doit normalement être désigné, mais si aucun officier ayant la compétence voulue n'est disponible, on peut nommer un adjudant).

3A Il faut donner le plus de détails possibles dans cette section afin d'être en mesure de déterminer si la blessure ou l'exposition était consécutive ou rattachée directement au service militaire. Veuillez joindre au formulaire tout document justificatif (formulaire Expres FC, ordres courants, programme d'entraînement physique de l'unité, liste des membres de l'équipe, les ordres et directives du cmdt, etc.).

3B Il faut donner autant de renseignements personnels que possible sur les témoins. Ces renseignements seront indispensables si jamais il est nécessaire d'obtenir de nouvelles déclarations auprès des témoins, surtout si beaucoup de temps s'est écoulé depuis l'incident. Il est important de joindre la déclaration des témoins (s'il y a lieu). Cependant, il n'est pas nécessaire de joindre une déclaration de tous les témoins de l'incident. Il faut être sélectif et inclure seulement la déclaration des témoins clés, celles qui ajoutent à la validité du CF 98.

SECTION 4

Le commandant ou un officier désigné par lui (grade de capt/lt(M) ou plus) doit remplir cette section. On doit réunir une commission d'enquête si les circonstances ayant entouré la blessure justifient une enquête poussée et à caractère officiel. Dans le cas où une commission d'enquête ne se réunit pas, une enquête sommaire doit être ordonnée, et ce si la blessure nécessite une hospitalisation de plus de 24 heures, si elle est d'une gravité telle qu'elle soulève des préoccupations immédiates à l'égard de la santé du militaire, qu'elle menace ou non sa vie, si elle est probablement de nature à causer une invalidité permanente, dans tous les cas où l'indemnité d'invalidité – Force de Réserve peut être payable; et devrait être considérée s'il subsiste un doute quant à la permanence de la blessure.

ANNEX H
ACCIDENT PREVENTION REPORT

National Defence / Défense nationale

PROTECTED A (when completed) – **PROTÉGÉ A** (une fois rempli)

GENERAL SAFETY
ACCIDENT PREVENTION REPORT
This report may contain privileged information.
It shall be used for accident prevention purposes only.
See A-GG-040-002/AG-001 for completion instructions.

SÉCURITÉ GÉNÉRALE
RAPPORT SUR LA PRÉVENTION D'ACCIDENTS
Le présent rapport peut contenir des informations réservées.
Il ne doit servir qu'à la prévention des accidents.
Consulter A-GG-040-002/AG-001 pour les instructions d'achèvement.

TYPE OF REPORT – GENRE DE RAPPORT

New complete / Formulaire initial complet **NC** ☐ | New incomplete / Formulaire initial incomplet **NI** ☐ | Revision incomplete / Révision incomplète **RI** ☐ | Revision complete / Révision complète **RC** ☐

A. GENERAL INFORMATION / INFORMATIONS GÉNÉRALES

1. Unit Serial No. / N° de série de l'unité
2. Command / Commandement
3. Base, Station, Unit, Ship / Base, station, unité, navire
4. Branch, Section, Sub-unit / Branche, section, sous-unité

B. ACCIDENT DATA / DONNÉES DE L'ACCIDENT

1. DATE (day, month, year) (jour, mois, année)
2. HOUR (24 hr clock) / HEURE (cadran 24 hr.)
3. DUTY STATUS – ÉTAT DE SERVICE

FIELD / DEPLOYED OPERATION / EN CAMPAGNE / DÉPLOIEMENT = **D**
BASE / GARRISON / BASE / GARNISON = **G**
AUTHORIZED SPORTS / SPORTS AUTORISÉS = **S**
NOT ON DUTY / HORS SERVICE = **P**

4. WITNESS(ES) – TÉMOIN(S)
5. LOCATION OF ACCIDENT – LIEU DE L'ACCIDENT

C. INJURED PERSON / PERSONNE(S) BLESSÉE(S)

1. SURNAME, INITIALS – NOM DE FAMILLE, INITIALES
2. PERSONAL NUMBER / NUMÉRO PERSONNEL
3. PERSONAL STATUS – STATUT PERSONNEL

REGULAR / RÉGULIER = **M**
RESERVE - MILITIA / RÉSERVE - MILICE = **R**
CADETS / CADETS = **A**
CIVILIAN / PERS CIVIL = **C**
CADET INSTRUCTORS LIST / CADRE DES INSTRUCTEURS DES CADETS = **B**
NPF EMP / PERS FNP = **N**
OTHER / AUTRE = **O**

4. SEX – SEXE
MALE / MASCULIN =
FEMALE / FÉMININ =
5. AGE / ÂGE
6. TIME IN UNIT (years) / TEMPS À L'UNITÉ (années)
7. JOB EXPERIENCE (years) / EXPÉRIENCE PROFESSIONNELLE (années)
8. MOC - RANK / CEM - GRADE
9. CLASSIFICATION LEVEL / CLASSIFICATION NIVEAU

D. INJURY - MATERIEL DAMAGES / BLESSURE - DOMMAGES MATÉRIELS

1. INJURY CLASSIFICATION – CATÉGORIE DE BLESSURE

FATAL / MORTELLE = **1**
DISABLING / INVALIDANTE = **2**
NON DISABLING / NON INVALIDANTE = **3**
FIRST AID / PREMIERS SOINS = **4**
NO INJURY / AUCUNE BLESSURE = **5**

2. NATURE AND EXTENT OF INJURY AND/OR DAMAGE – NATURE ET GRAVITÉ DE LA BLESSURE ET/OU DES DOMMAGES
3. PART OF BODY / PARTIE DU CORPS
4. SOURCE OF INJURY / SOURCE DE LA BLESSURE
5. NATURE OF INJURY / NATURE DE LA BLESSURE
6. ESTIMATED TOTAL COST (repair, replacement or rental, etc.) / COÛT ESTIMATIF TOTAL (réparation, remplacement ou location, etc)

E. SEQUENCE OF EVENTS / DÉROULEMENT DES ÉVÉNEMENTS

1. DESCRIBE HOW THE ACCIDENT OCCURRED – DÉCRIRE COMMENT L'ACCIDENT S'EST PRODUIT
2. MARITIME, LAND, AIR OPERATIONS / TRAINING / OPÉRATIONS ET FORMATION - MARITIMES, TERRESTRES ET AÉRIENNES
3. ACCIDENT TYPE / TYPE D'ACCIDENT

F. CAUSE FACTORS / FACTEURS DE CAUSES D'ACCIDENTS

1. CAUSE(S) – DESCRIBE / DÉCRIRE
2. PERSONNEL
3. MATERIAL, EQPT / MATÉRIEL, ÉQPT
4. ENVIRONMENT / ENVIRONNEMENT

CF 663 (8-92) 7530-21-910-6276

Design: Forms Mgmt 993-4050 (10-98)
Conception : Gestion des formulaires 993-3778

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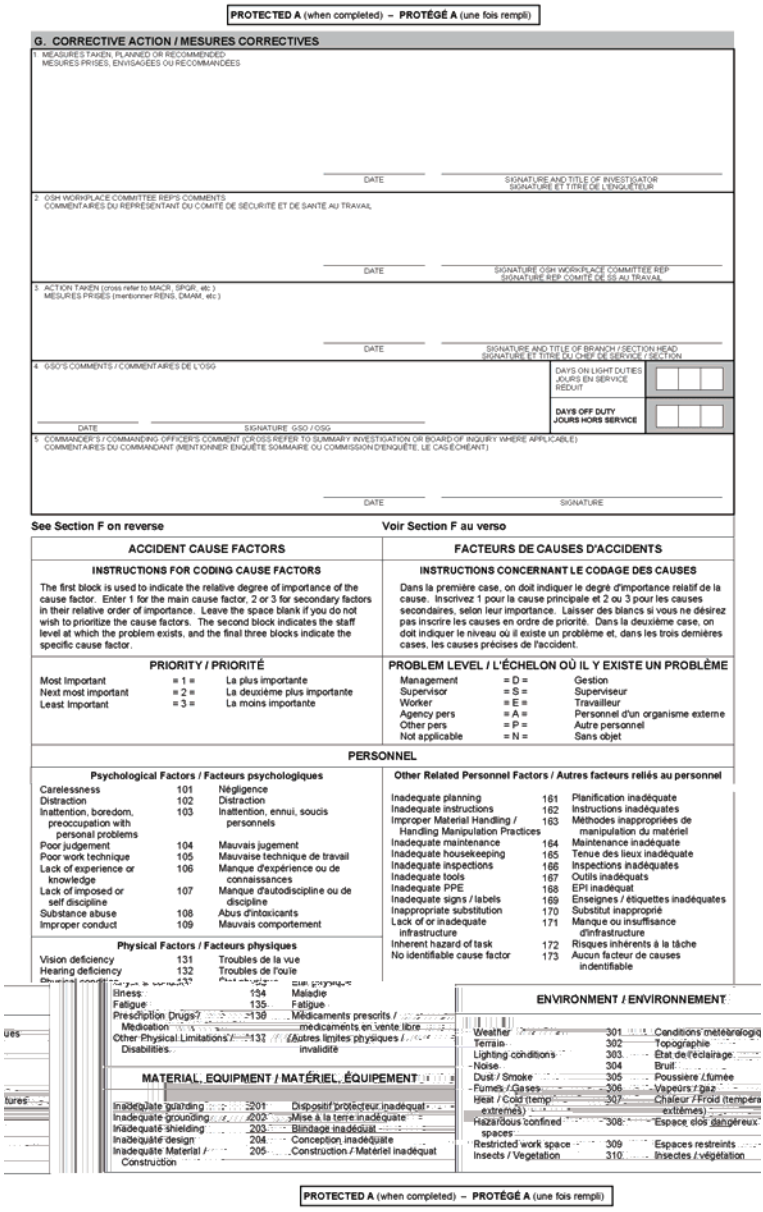

PROTECTED A (when completed) – **PROTÉGÉ A** (une fois rempli)

G. CORRECTIVE ACTION / MESURES CORRECTIVES

1 MEASURES TAKEN, PLANNED OR RECOMMENDED
MESURES PRISES, ENVISAGÉES OU RECOMMANDÉES

DATE — SIGNATURE AND TITLE OF INVESTIGATOR
SIGNATURE ET TITRE DE L'ENQUÊTEUR

2 OSH WORKPLACE COMMITTEE REP'S COMMENTS
COMMENTAIRES DU REPRÉSENTANT DU COMITÉ DE SÉCURITÉ ET DE SANTÉ AU TRAVAIL

DATE — SIGNATURE OSH WORKPLACE COMMITTEE REP
SIGNATURE REP COMITÉ DE SS AU TRAVAIL

3 ACTION TAKEN (cross refer to MACR, SPGR, etc.)
MESURES PRISES (mentionner RENS, DMAM, etc.)

DATE — SIGNATURE AND TITLE OF BRANCH / SECTION HEAD
SIGNATURE ET TITRE DU CHEF DE SERVICE / SECTION

4 GSO'S COMMENTS / COMMENTAIRES DE L'OSG

DAYS ON LIGHT DUTIES
JOURS EN SERVICE RÉDUIT

DAYS OFF DUTY
JOURS HORS SERVICE

DATE — SIGNATURE GSO / OSG

5 COMMANDER'S / COMMANDING OFFICER'S COMMENT (CROSS REFER TO SUMMARY INVESTIGATION OR BOARD OF INQUIRY WHERE APPLICABLE)
COMMENTAIRES DU COMMANDANT (MENTIONNER ENQUÊTE SOMMAIRE OU COMMISSION D'ENQUÊTE, LE CAS ÉCHEANT)

DATE — SIGNATURE

See Section F on reverse — **Voir Section F au verso**

ACCIDENT CAUSE FACTORS / **FACTEURS DE CAUSES D'ACCIDENTS**

INSTRUCTIONS FOR CODING CAUSE FACTORS

The first block is used to indicate the relative degree of importance of the cause factor. Enter 1 for the main cause factor, 2 or 3 for secondary factors in their relative order of importance. Leave the space blank if you do not wish to prioritize the cause factors. The second block indicates the staff level at which the problem exists, and the final three blocks indicate the specific cause factor.

INSTRUCTIONS CONCERNANT LE CODAGE DES CAUSES

Dans la première case, on doit indiquer le degré d'importance relatif de la cause. Inscrivez 1 pour la cause principale et 2 ou 3 pour les causes secondaires, selon leur importance. Laisser des blancs si vous ne désirez pas inscrire les causes en ordre de priorité. Dans la deuxième case, on doit indiquer le niveau où il existe un problème et, dans les trois dernières cases, les causes précises de l'accident.

PRIORITY / PRIORITÉ

Most Important	= 1 =	La plus importante
Next most important	= 2 =	La deuxième plus importante
Least Important	= 3 =	La moins importante

PROBLEM LEVEL / L'ÉCHELON OÙ IL Y EXISTE UN PROBLÈME

Management	= D =	Gestion
Supervisor	= S =	Superviseur
Worker	= E =	Travailleur
Agency pers	= A =	Personnel d'un organisme externe
Other pers	= P =	Autre personnel
Not applicable	= N =	Sans objet

PERSONNEL

Psychological Factors / Facteurs psychologiques

Carelessness	101	Négligence
Distraction	102	Distraction
Inattention, boredom, preoccupation with personal problems	103	Inattention, ennui, soucis personnels
Poor judgement	104	Mauvais jugement
Poor work technique	105	Mauvaise technique de travail
Lack of experience or knowledge	106	Manque d'expérience ou de connaissances
Lack of imposed or self discipline	107	Manque d'autodiscipline ou de discipline
Substance abuse	108	Abus d'intoxicants
Improper conduct	109	Mauvais comportement

Physical Factors / Facteurs physiques

Vision deficiency	131	Troubles de la vue
Hearing deficiency	132	Troubles de l'ouïe
[illegible]	[illegible]	[illegible]
Illness	134	Maladie
Fatigue	135	Fatigue
Prescription Drugs? Medication	136	Médicaments prescrits / médicaments en vente libre
Other Physical Limitations / Disabilities	137	Autres limites physiques / invalidité

Other Related Personnel Factors / Autres facteurs reliés au personnel

Inadequate planning	161	Planification inadéquate
Inadequate instructions	162	Instructions inadéquates
Improper Material Handling / Handling Manipulation Practices	163	Méthodes inappropriées de manipulation du matériel
Inadequate maintenance	164	Maintenance inadéquate
Inadequate housekeeping	165	Tenue des lieux inadéquate
Inadequate inspections	166	Inspections inadéquates
Inadequate tools	167	Outils inadéquats
Inadequate PPE	168	EPI inadéquat
Inadequate signs / labels	169	Enseignes / étiquettes inadéquates
Inappropriate substitution	170	Substitut inapproprié
Lack of or inadequate infrastructure	171	Manque ou insuffisance d'infrastructure
Inherent hazard of task	172	Risques inhérents à la tâche
No identifiable cause factor	173	Aucun facteur de causes indentifiable

MATERIAL, EQUIPMENT / MATÉRIEL, ÉQUIPEMENT

Inadequate guarding	201	Dispositif protecteur inadéquat
Inadequate grounding	202	Mise à la terre inadéquate
Inadequate shielding	203	Blindage inadéquat
Inadequate design	204	Conception inadéquate
Inadequate Material / Construction	205	Construction / Matériel inadéquat

ENVIRONMENT / ENVIRONNEMENT

Weather	301	Conditions météorologiq
Terrain	302	Topographie
Lighting conditions	303	Etat de l'éclairage
Noise	304	Bruit
Dust / Smoke	305	Poussière / fumée
Fumes / Gases	306	Vapeurs / gaz
Heat / Cold (temp extremes)	307	Chaleur / Froid (tempéra extrêmes)
Hazardous confined spaces	308	Espace clos dangereux
Restricted work space	309	Espaces restreints
Insects / Vegetation	310	Insectes / végétation

PROTECTED A (when completed) – **PROTÉGÉ A** (une fois rempli)

ANNEX I
UNSATISFACTORY CONDITION REPORT (UCR)

National Défense
Defence nationale

UNSATISFACTORY CONDITION REPORT (UCR) - RAPPORT D'ÉTAT NON SATISFAISANT (RENS)

1. PRIORITY/ PRIORITÉ: URGENT ☐		ROUTINE ☐	INFO ONLY/ INFORMATION SEULEMENT ☐	For preparation refer to: / Pour préparer référer:	C-02-015-001/AG-000
2. UNIT/BASE/WING/SHIP UNITÉ/BASE/ESCADRE/NAVIRE		3. UCR REF No. N° DE RÉFÉRENCE DU ENS	4. DATE SUBMITTED DATE DU RAPPORT	5. MESSAGE REF. (IF APPLICABLE) RÉFÉRENCE A UN MESSAGE (LE CAS ÉCHEANT)	
6. IDENTIFICATION DATA/DONNÉES D'IDENTIFICATION		FAILED ITEM/ARTICLE DÉFECTUEUX		NEXT HIGHER ASSEMBLY COMPOSANT IMMÉDIATEMENT SUPÉRIEUR	
7. NOMENCLATURE/ NAME-NOM					
8. NATO STOCK NUMBER N° DE NOMENCLATURE OTAN					
9. PART NO./CIRCUIT DESIGNATION N° DE PIÈCE/NOM DU CIRCUIT					
10. TYPE OR MODEL TYPE OU MODÈLE					
11. SERIAL NUMBER N° DE SÉRIE					
12. MANUFACTURER AND DATE FABRICANT ET DATE		DATE		DATE	
13. PLAN/DRAWING NUMBER N° DE PLANCE DESSIN					
14. WORK UNIT CODE/GUIDE LIST NO. CODE DE TRAVAIL/LISTE N°					
15. HOURS, MILEAGE, MONTHS, EFC OR ROUNDS FIRED SINCE: NOMBRE D'HEURES, DE MILLES, DE MOIS,DE CHARGES MAXIMALES ÉQUIVALENTES OU DE COUPS TIRÉS DEPUIS:	NEW/FABRICATION	REBUILD/&O-REFLECTION		PLANNED MAINT./ENTRETIEN PÉRIODIQUE	
16. LAST REBUILD/&O BY DERNIÈRE RÉFECTION PAR		DATE			
17. TYPE OF LAST PLANNED/PREVENTIVE MAINT. GENRE DU DERNIER ENTRETIE PÉRIODIQUE/PRÉVENTIF	INSPECTION/SCHEDULE NO. INSPECTION/CALENDRIER N°		CAR/ITEM NO. CARTE/ARTICLE N°	ROUTINE COURANT	
18. CONTRACT NO. (IF APPLICABLE) N° DE CONTRAT (SI DISPONIBLE)	19. RECEIVED FROM-PROVENANCE		20. SDR/ NO. N° DU BON DE COMMANDE	21. BATCH/LOT No. N° DE LOT	
22. INSTALLED ON-ARTICLE INSTALLÉ SUR AIRCRAFT/AÉRONEF ☐ SHIP/NAVIRE ☐ VEHICLE/VÉHICULE ☐ SITE/PLACE ☐		23. EQUIP. IDENT./APPL. CODE CODE D'IDENTITÉ/APPL. D'ÉQUIP		24. CRF/SERIAL NO. MATRICULE FC/ N° DE SÉRIE	
25. SUBJECT OF REPORT-OBJET DU RAPPORT:					
26. FAILURE DATE/DÉFECTUOSITÉ	27. PERSON-HOURS TO REPAIR HEURES-PERSONNES POUR RÉPARAR		28. NO. OF PREVIOUS FAILURES (LOCAL) N°DE DÉFECTUOSITÉS ANTÉRIEURES (LOCALES)		
29. DISPOSITION-MESURE PRISE ENCLOSED/ ANNEXÉ ☐ HOLDING FOR INVESTIGATION FOR DISPOSAL /SERVICE / POUR AFFECTATION RETENU POUR ENQUÊTE ☐ RETURNED TO SUPPLY FOR DISPOSAL/ RENVOYÉ AU DÉPÔT ☐ RETURNED TO SERVICE/ REMIS EN SERVICE ☐			30. ENCLOSURES-ANNEXES PHOTOS/ PHOTOGRAPHIES ☐ DRAWINGS/ DESSINS ☐ OTHER/ AUTRE ☐		

CF 777 (5-99) FORM OPI: DBCM 2-7 FORMULAIR BPR: DCOG 2-7

31. **AMPLIFYING DETAILS: (ORIGINATOR)** INCLUDE COMPLETE DETAILS SUCH AS (A) DESCRIPTION OF DIFFICULTY (B) DESCRIPTION OF FAILED ITEM (C) ENVIRONMENTAL FACTORS (D) EVENTS PRIOR TO DIFFICULTY (E) PROBABLE CAUSE (F) SECONDARY EFFECTS (G) ACTION TAKEN (H) MOD STATUS (J) RECOMMENDATIONS.	31. **DÉTAILS COMPLÉMENTS: (AUTEUR)** DONNER DES DÉTAILS COMPLETS TELS QUE (A) EXPOSÉ DU PROBLÈME (B) DESCRIPTION DE L'ARTICLE DÉFECTUEUX (C) FACTEURS D'ENVIRONNEMENT (D) ÉVÉNEMENTS QUI ONT PRÉCÉDÉS LA DÉFECTUOSITÉ (E) CAUSE PROBABLE (F) EFFETS SECONDAIRES (G) MESURES PRISES (H) MODIFICATIONS APPORTÉES (J) RECOMMANDATIONS.

ORIGINATOR'S NAME-NOM DE L'AUTEUR	RANK-GRADE	APPT.-FONCTION	TEL. NO.-N° DE TÉL.	DATE

32. **SUBSTANTIATION: (DEPARTMENTAL SPECIALIST)** INCLUDE RECOMMENDATIONS. INCLUDE DETAILS SUCH AS (A) RESULTS OF RESEARCH (B) EFFECTS ON PERFORMANCE OF EQUIPMENT (C) EFFECTS ON SUB SYSTEMS (D) DOES REPORT WARRANT ACTION? IF SO, INCLUDE RECOMMENDATIONS.	32. **JUSTIFICATION/APPROBATION: (AUTORITÉ SUPÉRIEURE SPÉCIALISTE)** INCLURE DÉTAILS SUR (A) RÉSULTEATS DES RECHERCHES (B) EFFETS SUR LE FONCTIONNEMENT DE L'ÉQUIPMENT (C) EFFETS SUR LES SOUS-COMPOSANTS (D) DES MESURES ULTÉRIEURES SONT-ELLES JUSTIFIÉES, INCLURE LES RECOMMANDATIONS

SIGNATURE: APPROVAL (SENIOR SPECIALIST AUTHORITY) JUSTIFICATION (AUTORITÉ SUPÉRIEURE SPÉCIALISTE)	RANK-GRADE	APPT.-FONCTION	TEL. NO.-N° DE TÉL.	DATE

33. **TECHNICAL AUTHORITY (TA) RESPONSE:** INCLUDE DETAILS OF ACTION TAKEN TO RESOLVE UNSATISFACTORY CONDITION AND APPROPRIATE DETAILS OF ARRANGEMENTS/AGREEMENTS WITH OCTs	33. **REPONSE D'ATORITE FUNCIONELLE:** AJOUTER LES DÉTAILS DES MESURES PRISES POUR RECTIFIER L'ETAT NON SATISFAISANT ET LES DÉTAILS APROPRIES CONCERNANT LES ENTENTES AVEC LES BUREAUX DE RESPONSABILITÉ AUXILIARE (BRA)

TA NAME/NOM DE AF	RANK-GRADE	APPT.-FONCTION	TEL. NO.-N° DE TÉL.	DATE

CF 777 (5-99)

FORM OPI: DBCM 2-7
FORMULAIR BPR: DCOG 2-7

INSTRUCTIONS FOR COMPLETION OF FORM CF 98

GENERAL INFORMATION

A CF 98 shall be completed for all injuries and all exposure or suspected exposure to toxic substances or material. An injury such as a sprain, for example, may be a factor in a future more serious medical condition. Ensure that statements made by injured/exposed persons and witnesses are:

- in the first person;
- in their own words;
- brief, but contain details of the circumstances under which the injury was sustained; and
- signed and dated by the person making the statement.

Where it is necessary to submit a statement of a witness, the CO shall detail an officer other than the supervisor to obtain the statement.

SECTION 1

Ensure that all information required is provided.

SECTION 2

Ensure that SECTION 2 is completed by the injured member, however, if the injured member is unable to make a statement, the report shall be submitted and a statement obtained and forwarded as soon as possible.

Health professional means any person qualified and authorized to give care (physicians, nurses, medical assistant, chiropractor, etc.).

If a member is seen by a health professional that is not employed by the CF, then the member should request that a copy of the professional report be sent to his supporting medical unit. This may require that the member sign an authorization for the disclosure of medical information.

[redacted]

3A This section should be completed in as much detail as possible so as to clarify whether the injury or the exposure arose out of or was directly connected to military service. Substantiating documentation (CF Expres form, routine orders, unit physical training program, team list, CO's orders and directives, etc.) shall be attached.

3B Provide witnesses' personal information in as much detail as possible. Such identification is essential should it be necessary to obtain further statements from witnesses especially when required long after the event. It is important that witnesses' statements be attached (if applicable). However, it is not necessary to attach the statement of every witness to the injury. Be selective and include only the key witnesses' statements that will add to the validity of the CF 98.

SECTION 4

The CO or an officer designated by the CO (rank of Capt/Lt(N) or above) shall complete this section. A board of inquiry should be convened if the circumstances surrounding the injury are such that a detailed and formal investigation is warranted. If a board of inquiry is not convened, a summary investigation shall be ordered if the injury requires hospitalization for more than 24 hours, is of such severity that there is cause for immediate concern for the health of the member, whether the member's life is in danger or not, is likely to cause permanent disability, or in cases where compensation for disability – Reserve Force is considered payable. It should be considered if there is any doubt about the permanency of the injury.

INSTRUCTIONS POUR REMPLIR LE FORMULAIRE CF 98

RENSEIGNEMENTS GÉNÉRAUX

Il faut remplir un CF 98 dans tous les cas de blessure ou d'exposition réelle ou soupçonnée à une substance ou du matériel toxique. Toute blessure (une entorse, par exemple) peut devenir ultérieurement l'élément d'un problème médical plus sérieux. Les déclarations de la victime et des témoins doivent être :

- rédigées à la première personne;
- rédigées dans ses propres mots;
- brèves, tout en comportant des détails précis sur les circonstances de la blessure;
- signées et datées par la victime ou le témoin.

Lorsqu'il est nécessaire de soumettre la déclaration d'un témoin, le commandant désignera un officier autre que le superviseur pour obtenir cette déclaration.

SECTION 1

Veillez à ce que tous les renseignements requis soient fournis.

SECTION 2

Veillez à ce que la SECTION 2 soit remplie par la victime. Cependant, si la victime n'est pas en mesure de faire une déclaration, le rapport doit être soumis et une déclaration obtenue et acheminée dès que possible.

Par professionnel de la santé, on entend une personne qualifiée et autorisée à prodiguer des soins (médecins, infirmiers ou infirmières, adjoints médicaux, chiropraticiens, etc.).

Si le militaire est vu par un professionnel de la santé qui n'est pas au service des FC, le militaire devrait demander qu'une copie du rapport médical soit envoyée à son unité médicale de soutien. On pourra demander au militaire de signer un formulaire autorisant la communication de renseignements médicaux.

SECTION 3

Le commandant a la responsabilité de s'assurer que les cas de blessures/d'expositions soient documentés adéquatement en vue d'un usage futur par les FC ou le militaire. Le commandant désignera un officier pour remplir la section 3 (un officier doit normalement être désigné, mais si aucun officier ayant la compétence voulue n'est disponible, on peut nommer un adjudant).

3A Il faut donner le plus de détails possibles dans cette section afin d'être en mesure de déterminer si la blessure ou l'exposition était consécutive ou rattachée directement au service militaire. Veuillez joindre au formulaire tout document justificatif (formulaire Expres FC, ordres courants, programme d'entraînement physique de l'unité, liste des membres de l'équipe, les ordres et directives du cmdt, etc.).

3B Il faut donner autant de renseignements personnels que possible sur les témoins. Ces renseignements seront indispensables si jamais il est nécessaire d'obtenir de nouvelles déclarations auprès des témoins, surtout si beaucoup de temps s'est écoulé depuis l'incident. Il est important de joindre la déclaration des témoins (s'il y a lieu). Cependant, il n'est pas nécessaire de joindre une déclaration de tous les témoins de l'incident. Il faut être sélectif et inclure seulement la déclaration des témoins clés, celles qui ajoutent à la validité du CF 98.

SECTION 4

Le commandant ou un officier désigné par lui (grade de capt/lt(M) ou plus) doit remplir cette section. On doit réunir une commission d'enquête si les circonstances ayant entouré la blessure justifient une enquête poussée et à caractère officiel. Dans le cas où une commission d'enquête ne se réunit pas, une enquête sommaire doit être ordonnée, et ce si la blessure nécessite une hospitalisation de plus de 24 heures, si elle est d'une gravité telle qu'elle soulève des préoccupations immédiates à l'égard de la santé du militaire, qu'elle menace ou non sa vie, si elle est probablement de nature à causer une invalidité permanente, dans tous les cas où l'indemnité d'invalidité – Force de Réserve peut être payable; et devrait être considérée s'il subsiste un doute quant à la permanence de la blessure.

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CHAPTER 2
LANDING ZONE OPERATIONS

References:

a. ATP-49(C);

b. CFACM 40-46;

c. C-12-146-000/MB-002;

d. B-GA-100-001/AA-000; and

e. Airmobile SOPs.

SECTION 1
GENERAL

1. The use of the helicopter by land forces has increased their mobility, flexibility, speed of movement, and the capability to exploit surprise. The mobility and speed of a heliborne force reduces the limitations of time and space, and permits the commander to seize the initiative. It enables the force to traverse terrain obstacles, to bypass hostile areas, and to attack, seize, or destroy objectives deep in enemy territory.

CHARACTERISTICS OF HELIBORNE OPERATIONS

2. Heliborne ops have the following general characteristics:

a. The heliborne force can attain objectives that cannot be reached quickly by surface forces due to limitations imposed by obstacles, terrain, or enemy action. Even in areas where helicopter landings are not possible, troops and their equipment can be unloaded from a hovering helicopter by ladders or by rappelling means. Troops may also jump from low hovering helicopters.

b. Troops can be landed in tactical formations ready for immediate action, the landing zone (LZ) permitting.

c. Troops can be landed directly on, or near their objectives unwearied from long and tiring marches.

d. There is a high degree of flexibility because helicopters can be switched rapidly from one objective to another, can conduct subsequent

offensive or defensive ops, and can meet requirements over a large area.

e. The tactical mobility of heliborne forces permits a wider choice of directions from which to mount an attack, thus allowing the commander to achieve surprise. Because they possess a wide range of speed and high manoeuvrability at slower speeds, helicopters can fly safely and efficiently at low altitude, using the terrain and vegetation for cover and concealment.

f. Their ability to fly at high or low altitudes and to decelerate rapidly, combined with their capacity for slow forward speed and vertical landing, enables helicopters to operate under marginal weather conditions.

g. Helicopter ops facilitate a rapid concentration of force and regrouping on the battlefield, allowing the commander the freedom from maintaining large reserves, and giving him the ability to react quickly to take advantage of unforeseen circumstances.

LIMITATIONS

3. Heliborne ops are subject to the following limitations:

a. The types and amounts of heavy equipment that can be airlifted into an objective area are limited by the allowable cargo loads and by the dimensions of the cargo compartment or sling capability of the available helicopters. Internal loads must be properly distributed to keep the A/C's centre of gravity within allowable limits.

b. Heliborne forces have limited ground mobility and firepower until link-up with other forces is completed.

c. Local air superiority over the objective, the flight route, and suppression of enemy ground fire, are essential for successful heliborne ops.

d. Resupply and reinforcement by air may be necessary to sustain heliborne forces.

e. 8elicopters use large quantities of fuel and thus place heavy demands on the logistical system. Further, the high fuel consumption rate imposes limitations in range and cargo load.

f. Helicopter performance deteriorates considerably in high temperatures and at high density altitudes. Helicopters are difficult to operate in sleet, hail, icing conditions, and high or gusty winds.

g. Secrecy may be compromised by engine and rotor noise, or dust created by downwash.

SECTION 2
SELECTION OF HELICOPTER LANDING ZONE/SITES/POINTS

4. **Definitions**:

a. **Landing Zone (LZ)**. A specified zone within an objective area used for landing of AC.

b. **Landing Site (LS)**. A site within an LZ containing one or more landing points.

c. **Landing Point (LP)**. A point within a LS where one helicopter can land. It is occasionally referred to as a touchdown point.

Figure 2-1:

LANDING ZONE (LZ)

5. **Helicopter Landing Zone**. Helicopters are capable of taking-off and landing vertically, but only with light loads. To take-off or land with heavy loads an angled departure or approach must be made. Keep this in mind when selecting an LZ.

LANDING SITE (LS)

6. **Helicopter Landing Site**. It can be one large open field in which a number of helicopters can land safely, or a large area divided into sites by natural or man-made features, such as tree lines, fences, etc. Except for the size of the area, the principles for LS selection are the same as for LP selection, which will be covered next.

LANDING POINT (LP)

7. **Helicopter Landing Point**. The selection of a LP is based upon a number of important factors.

FOUR CONSIDERATIONS IN THE SELECTION OF A LANDING POINT

8. **LS/LP Dimensions**. The size of the LS will depend upon the number and size of the LPs within it and the dispersion requirements between LPs based upon the tactical situation. Helicopter units will specify NATO sizes 1 to 5 LP as required. The LP should conform to the minimum dimensions required for the type of helicopter in use. B-GA-442-001/FP-001 *Tactical Aviation Tactics, Techniques and Procedures* describes the five standard LPs used by Canada/NATO. In addition, it details the required LP sizes specific to each type of helicopter used in NATO. ATP-49(C) expands on this information as it pertains to NATO ops. The specific LP dimensions allow for the rotor clearance of the helicopter while manoeuvring for landing or take-off. There must be no obstruction overhanging this cleared area. For example: the CH-146 Griffon requires a size 2 LP, the CH-147 Chinook (Dutch) requires a size 3. Sizes:

a. Size 1—25 m diameter.

b. Size 2—37 m diameter.

c. Size 3—50 m diameter.

d. Size 4—80 m diameter.

e. Size 5—100 m diameter.

9. **Approaches**. No high obstacles should surround the LP particularly when the minimum size is selected. The approaches to and exits from the LP should be sufficiently clear of obstacles to allow for a shallow approach and take-off. There should no obstacles

presenting a continuous barrier around the LP, such as signal wire, high-tension line, etc. An easy rule of thumb for judging obstacle clearance is to sight a 6 ft-man standing 20 paces away (day), or 34 paces (night). As long as obstacles appear below the top of the man's head, the approach/exit path is suitable.

NOTE

Ideally there should be obstruction-free approaches and exit paths into the prevailing wind. In conditions of light wind, a single approach/exit path is acceptable.

10. **Surface**. The surface should be sufficiently firm to support a fully loaded helicopter. As a guide, the ground should be firm enough to allow a loaded vehicle to move without sinking.

11. **Light Recce Helicopter**. The LP must be firm enough to support a loaded light vehicle (e.g., G-Wagon).

12. **Light Transport Helicopter**. The LP must be firm enough to support a loaded 3-ton vehicle.

13. **Medium Helicopter**. The LP must be firm enough to support a loaded 10-ton vehicle. The whole LP must be cleared of any loose material or piles of dust/sand that could be dislodged by rotor downwash. LPs with sandy or dusty surfaces should be stabilized, or covered by a method agreeable with the helicopter unit. Any snow should be packed or removed to reveal potentially hazardous objects and to reduce the propagation of blowing snow; a marker is essential to provide a visual reference for depth perception and to reduce white-out effects.

14. **Slope of the Ground**. The ground should be relatively level, however, some degree of slope is acceptable. Sloped LPs should only be selected for day ops.

15. **Day Ops**. Maximum 7 degrees in any direction if the helicopter is to land. However, a greater slope may be acceptable for hover ops.

16. **Night Ops**. A reverse slope, as viewed from the approach path, is not normally acceptable. Forward and/or lateral slope should normally not exceed three degrees.

NOTE

When coordination with the helicopter unit is possible, these angles of slope may be exceeded, based upon the capability of the A/C.

SECTION 3
MARKING LANDING POINTS BY DAY

17. LSs and LPs should be marked when circumstances allow. Marking should be kept to a minimum and only displayed when actually required in order not to disclose positions to the enemy.

18. **Identification**. The letter "H" indicates a helicopter LS. A ground marshaller, panels, pre-arranged display of lights/codes, or any type of obvious marker, such as a small flag, may indicate individual LPs within a LS.

NOTE

There is a danger of insecure markers being dislodged by rotor downwash, causing damage by being sucked up into the rotor. Therefore, although acceptable, panels should be avoided where possible, and lights should be firmly secured, or removed before the helicopter hovers above them.

19. Many methods of marking a helicopter LP have been devised and used. The important factors are that the aircrew is advised of the location of the LP, that they provided with information regarding the condition of the ground, and that a suitable ground recognition signal is displayed. Visual aids such as flares, smoke, lights and fluorescent panels may be displayed when requested by the helicopter, but for security reasons, the following practice must be followed:

a. The ground unit displays visual aids, upon request (usually coloured smoke).

b. The pilot states the colour seen.

c. The ground unit confirms the signal seen is correct.

NOTE

Smoke can cause severe corrosion of magnesium and aluminium helicopter components. To prevent this, smoke generators should be placed so that smoke will not be blown onto intended LPs (i.e., downwind from LZ). Smoke can also be used to indicate wind direction, but should not be used unless requested by the pilot.

MARKING LANDING POINTS BY NIGHT

20. The normal night marking aids for a helicopter LP are:

a. Five-light letter “T” (See Annex B).

b. Four-light inverted letter “Y” (See Annex C).

NOTES

1. In the event these lights are not available, vehicle lights may be used for light helicopters (See Annex D). In an emergency, a single flashlight may be used.

2. These lights should be placed upwind one-third of the cleared area. This ensures as much approach clearance as possible.

3. When it is intended that a helicopter touch down at a “T”, it should be placed so that the helicopter is able to land on either side of the last light in the stem.

4. When it is intended that a helicopter touch down at an inverted “Y”, it should be placed so that the helicopter is able to land between the bottom two lights of the “Y”.

5. It is often necessary to carry external loads in or out of a night LP. This requires a considerable amount of coordination between the supported unit and the helicopter squadron prior to the op. For small-scale ops (e.g., a battalion delivery point), one lighted LP would probably suffice with drop-off and/or pick-up. For full-scale resupply ops, separate drop-off and pick-up points would be required.

SECTION 4
HELICOPTER DIMENSIONS

21. The following are important dimensions to remember when laying out helicopter landing zones/sites/points.

NOTES—FOR ALL HELICOPTERS

22. **Hard Surface**. The surface of the centre of the LP must be even and sufficiently firm to allow a fully loaded ground vehicle (e.g., ¼ ton for light helicopters; 3-ton for larger helicopters) to stop and start without sinking. The whole LP must be cleared of any loose materiel or piles of dust/sand that could be dislodged by rotor downwash. LPs with sandy or dusty surfaces should be stabilized or covered by an agreeable method. Any snow should be packed or removed to reveal potentially hazardous objects and to reduce the propagation of blowing snow; a marker is essential to provide a visual reference for depth perception and also to reduce white-out effects.

23. **CH-146 Griffon**:

a. Maximum Gross Weight—5400 kg (11900 lb) all-up weight [AUW].

b. Basic weight (summer)—3400 kg (7500 lb).

c. Basic weight (winter)—3550 kg (7800 lb).

d. Crew weight (summer)—275 kg (600 lb).

e. Crew weight (winter)—295 kg (650 lb).

24. **Allowable Load with Crew and SOP Fuel**:

a. Summer—1000 kg (2200 lb).

b. Winter—885 kg (1950 lb).

25. **Airmobile SOP Troop Load**:

a. Summer—8 passengers with packs.

b. Winter—6 passengers with packs & toboggan.
* summer/winter without packs or toboggans—12 passengers.

NOTES

1. 12-seat configuration is **NOT** a standard configuration; the aviation unit must be notified.

2. For planning purposes, the CH 146 casualty loads are:

a. Standard Configuration:

(1) three stretchers on the left side; and

(2) four walking wounded maximum; and

Note: If a medical attendant accompanies the wounded, then the number of walking wounded is reduced to maximum of three.

b. Emergency MEDEVAC configuration:

(1) six stretchers, three on each side; and

(2) one medical attendant (helicopter trained).

Note: This configuration is only utilized in mass evacuations and requires personnel trained in loading and unloading helicopters.

26. **Dimensions**:

a. Length (rotor tip to tail)—56 ft 2 in (17.1 m).

b. Width—9 ft 4 in (2.84 m).

c. Rotor diameter—46 ft (14.02 m).

d. Spacing between CH-146s—minimum 37 m.

27. **NATO DIMENSIONS** (Landing points). The size of an LS will depend upon the number and size of LPs within it. Using the criteria provided in ATP-49(C), a helicopter LP will be designated as NATO size 1, 2, 3, 4 or 5. Numerous considerations, such as helicopter type, unit proficiency, nature of loads, climatic considerations and day or night ops may apply. In the absence of information from the helicopter unit a NATO size 5 will be chosen.

a. Size 1—25 m diameter.

b. Size 2—37 m diameter.

c. Size 3—50 m diameter.

d. Size 4—80 m diameter.

e. Size 5—100 m diameter.

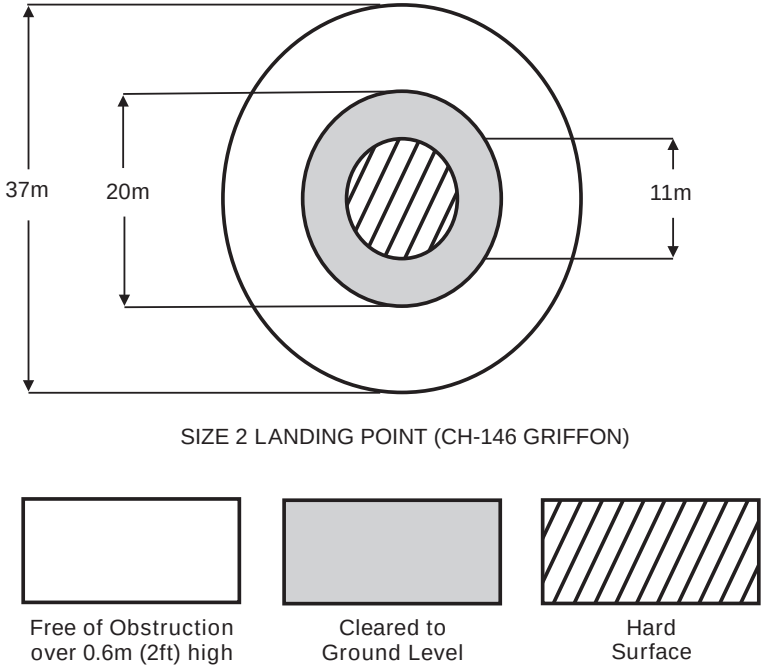

Figure 2-2: Size 2 Landing Point

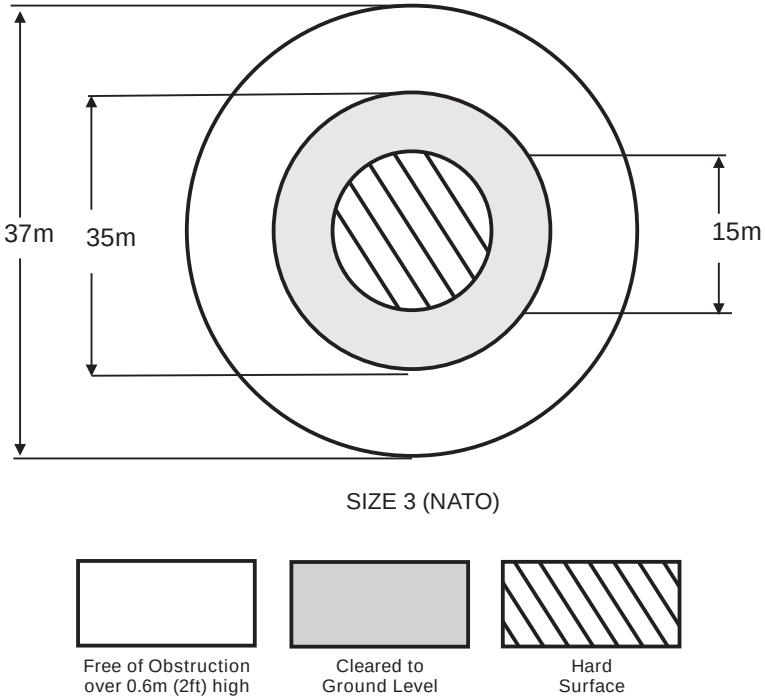

Figure 2-3: Size 3 (NATO)

SECTION 5
GUIDING PROCEDURES

28. **Clock Ray Method**. When the pilot cannot identify a LP, he will request assistance from the LP Controller. The following method is the most commonly used:

a. The pilot will contact the LP by radio and state that he cannot identify the LP location.

b. The LP Controller will give direction as follows:

(1) **REFERENCE LINE OF FLIGHT, GO AT ..... O'CLOCK FOR ..... M/KM.**

(2) **IF ADDITIONAL CORRECTIONS ARE REQUIRED, THE SAME PROCEDURE WILL BE USED. SEE ANNEX H.**

29. **Cardinal Point Method**. Another method which can be used to guide the pilot to the LP is the cardinal point method. Simply advise the pilot in which direction to fly (e.g., "You are flying south of my location"). See Annex I.

30. **Homing Method**:

a. All helicopters are capable of finding a unit location by "homing" on their radio.

b. The procedure for homing is:

(1) **Helicopter**. **32 THIS IS HOTEL 12, TRANSMIT 15 SEC FOR HOMING OVER**.

(2) **C/S 32**. **32 ROGER**—ground station keeps transmission button depressed for 15 seconds—**32 OUT**.

c. Whenever signal operating instructions are issued that includes a code word for "homing," the code word will be used; all other procedures will remain the same.

d. During the no voice transmission, the pilot will steer towards the unit location. If the pilot requires further directional assistance, the procedure will be repeated using 10-second no-voice transmissions.

GUARD FREQUENCIES

31. All helicopters monitor frequencies 121.5 and 243.0 at all times, irrespective of the frequency in use. These frequencies are for emergency use. If a helicopter can be seen, he can be contacted on either one of these frequencies.

32. The unit calling should state the helicopter's location and direction of flight as follows:

a. **Griffon over Hill 610, Flying North at Low Altitude**. "This is 32 on FM guard. Contact me on (frequency or code word)".

b. Knowledge of these frequencies may save lives in the event of an emergency or casualty evacuation. **Remember**, the life you save may be your own.

SECTION 6
NIGHT VISION GOGGLE OPERATIONS

33. The introduction of night vision goggles (NVG) resulted in a much-increased capability to provide low level, tactical night support. NVG work on the principle of gathering and intensifying existing light. There are certain conditions where the existing light level is so low that insufficient light exists to allow safe low level flight, therefore NVG do not turn light into day.

34. There exists a period of time at sunset and sunrise where there is either not enough light to day tactically fly or too much light to night tactically fly with NVG. The length of this period of time is mainly dependent upon the speed of the setting or rising sun. Longer periods exist in northern and southern latitudes while shorter periods exist near the equator. This period of time may be as short as twenty minutes or as long as several hours.

35. Due to complexities of NVG flight, more consideration is required for both mission and flight planning, therefore more time must be allowed for battle procedure. Virtually all mission profiles can be flown using NVG, although the task efficiency of some are greatly reduced due to their limitations.

36. When selecting an LZ for NVG ops, helicopter approach and departure routes should, whenever possible, be aligned away from bright lights sources (e.g., artillery, flares, etc.).

37. During all NVG ops where the helicopter approaches the pick-up-point, only theload to be picked up will be marked with an NVG compatible chemical stick. The A/C may have no visible exterior lights turned on during the op except for the infrared (I/R) searchlight and essential internal cockpit lighting. The Flight Engineer will illuminate the cargo hook with a handheld flashlight during hook-up. When personnel conducting the hook-up are not equipped with NVG, the A/C shall operate with navigation lights on ”dim” as a minimum. If there is more than one drop-off point in the LZ, the marshaller must indicate which drop-off point is to be used by pointing to the required spot. The marshaller will use IR chemical lights as marshalling wands.

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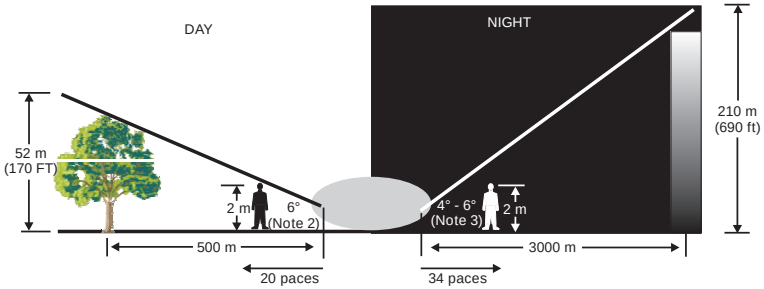
ANNEX A
OBSTACLE CLEARANCE

The following rule of thumb should be used to ensure that no high obstacles obstruct the run-in and run-out. Sight from ground level at touchdown point.



NOTES

1. The obstruction angle is measured from the point where the landing or take-off paths intersect the stipulated "cleared to ground level" area of the landing point.
2. By day the obstruction height cannot exceed an approach angle of 6 degrees out to 500 m from the landing point.
3. By night the obstruction height cannot exceed an obstruction angle of 4 degrees out to 3000 m from the landing point unless a glide slope indicator is used when the obstruction angle can be 6 degrees.
4. Pilot may intercept the glide slope at any height.
5. Warning. Sight for ground level at the touchdown point.

Day and Night Obstacle Clearance

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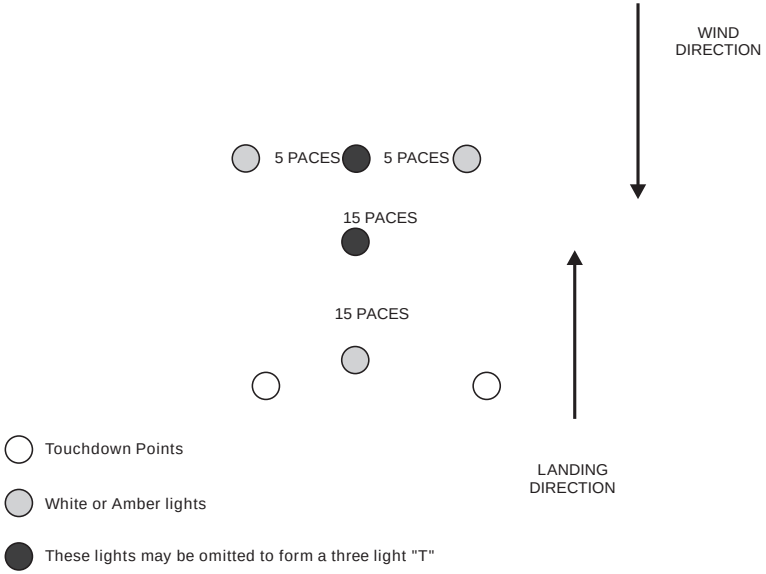
ANNEX B
NIGHT LANDING AIDS

HELICOPTER LANDING POINTS
NORMAL "T"



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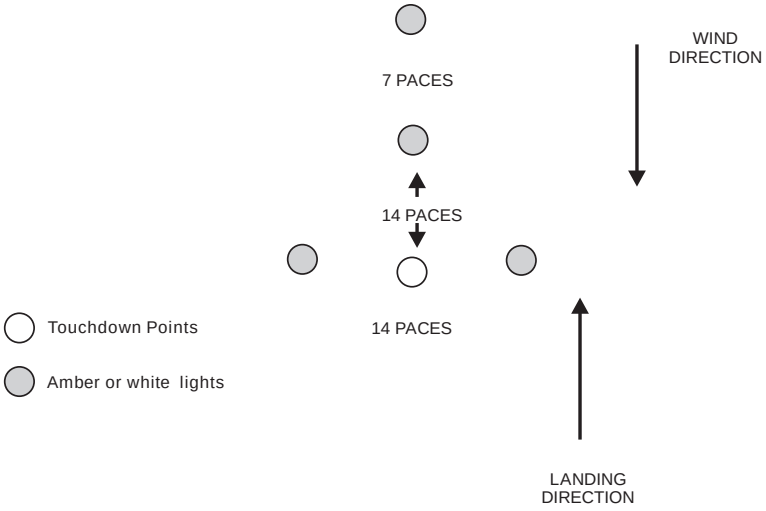
ANNEX C
NIGHT LANDING AIDS

HELICOPTER LANDING POINT



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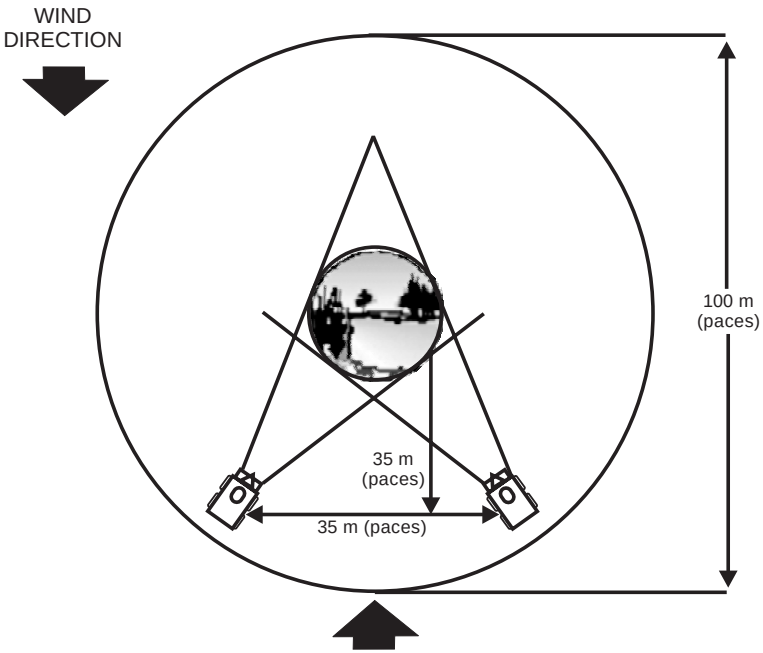
ANNEX D
EMERGENCY LIGHTING USING VEHICLES



The Emergency Method of Marking a Landing Point

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ANNEX E
NIGHT LANDING AIDS

SLINGING PICK-UP/DROP-OFF POINTS

Normal "T"

NOT

NOTE

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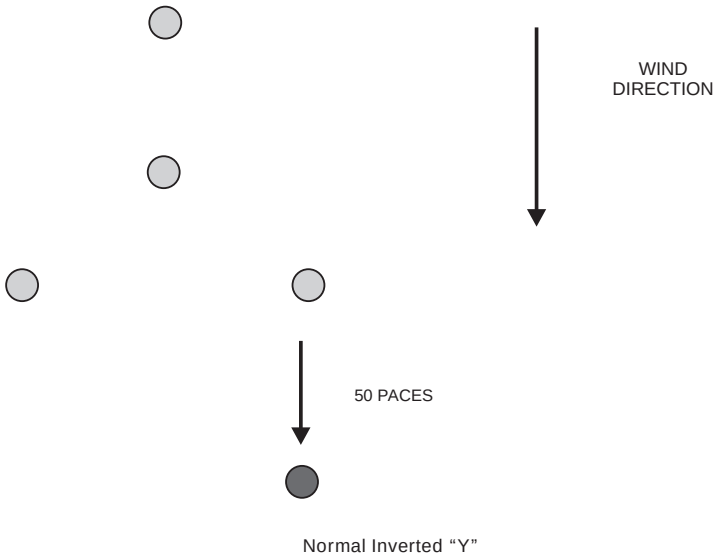
ANNEX F
NIGHT LANDING AIDS

SLINGING PICK-UP/DROP-OFF POINTS



Normal Inverted "Y"

NOTE:
The above information is for Griffon operations only; it is not a NATO SOP.

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ANNEX G
MARSHALLING SIGNALS

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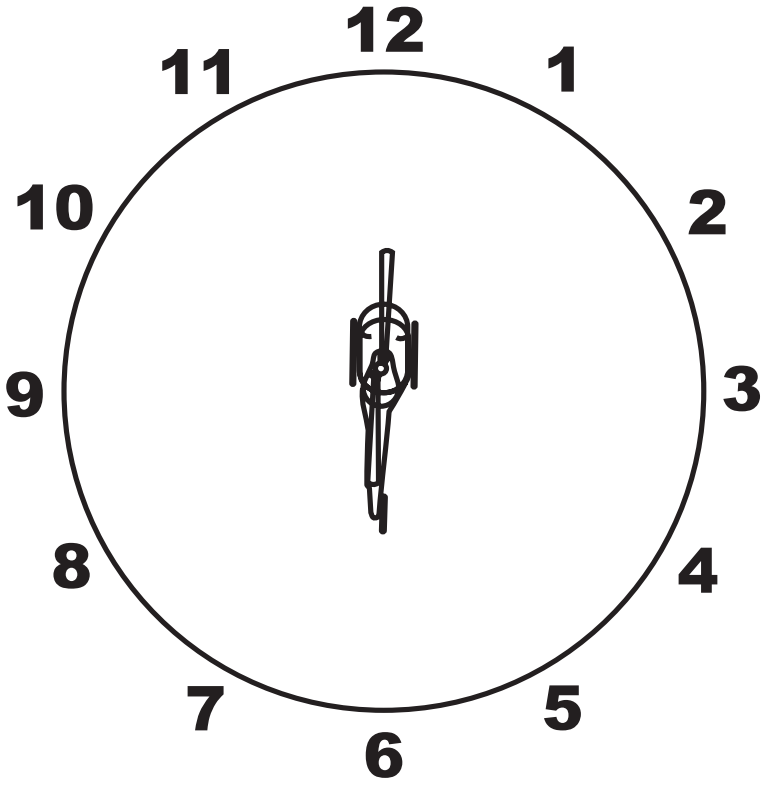
ANNEX H
CLOCK RAY METHOD



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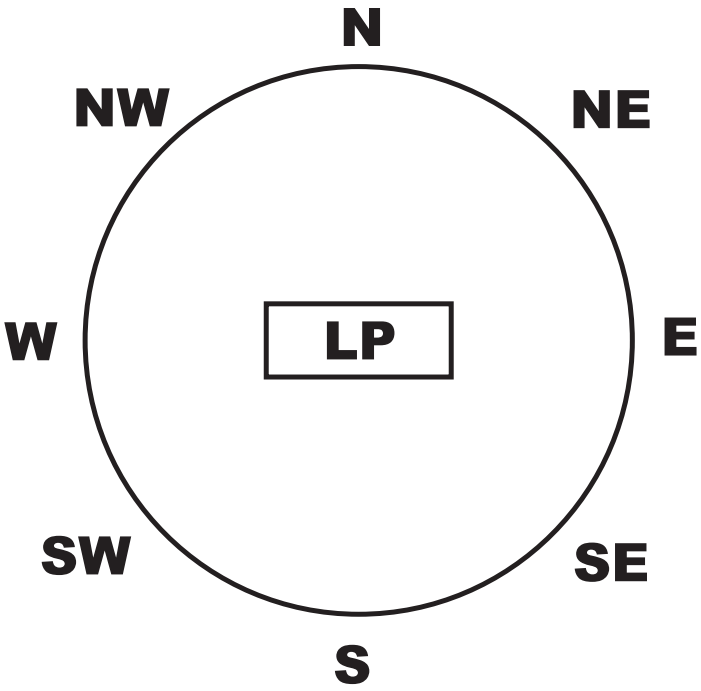
ANNEX I
CARDINAL POINT METHOD



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CHAPTER 3
AIR-LAND OPERATIONS

SECTION 1
INTRODUCTION

1. Air-land ops involve assault landings, tactical combat support operations, tactial air logistic support operations, special missions and tactical aeromedical evacuations. Depending upon the tactical plan, the airlift of troops and equipment will be completed in accordance with a loading plan based upon operational requirements.

LOADING PLAN

2. The following criteria for loading have been agreed upon by 1 CAD/LFC. They are:

a. **Combat Loading**. The airlift of combat troops with their equipment and supplies so that on arrival at destination, troops can deplane prepared for combat. Equipment and cargo are transported so that off-loading can be completed rapidly and without the aid of mechanical devices.

b. **Tactical Loading**. The airlift of combat troops with their equipment and supplies in the order specified by the land force commander. This will ensure that the sequence of arrival at destination meets the operational requirement. Units must be loaded in the sequence specified in the applicable unit or task force movement table, with the exception that, whenever recommended by the air element, deviations that will not seriously affect the tactical plan shall be approved by the unit emplaning officer (UEO) or optimum A/C utilization.

c. **Administrative Loading**. The airlift of troops, equipment and supplies in whatever order is required to ensure that optimum use is made of each A/C's carrying capability. Administrative loading should be used whenever the operational requirements permit.

ASSAULT LANDING OPERATIONS

3. Assault landing ops depend upon the tactical requirements and available airfields in the combat zone. This type of op may involve the use of austere airfields with short runways; no parking space and exposure to enemy ground fire.

4. The risks involved with assault landing ops demand consideration and detailed planning. In addition to tactical considerations (refer to SMM 60-2601(1) Chapter 2, Section 1, paragraph 2), the following planning factors will be considered:

a. minimum ground time;

b. land force tactical plan;

c. fire support plan;

d. use of 'engines running on/off' (ERO) and combat off load (COF).

AIRCRAFT SEATING CONFIGURATIONS

5. The seating configurations will be dependent upon the type of airlift employed and the dress of the troops. The UEO and mobile air movements section (MAMS) officers should work in close liaison to determine the seating arrangement since the configuration will determine the number of troops that can be airlifted. The CC-130 seats are normally spaced 20 inches, however, spacing may be adjusted to 24 inches to accommodate fully equipped troops.

SECTION 2
LANDING ZONE SELECTION, CRITERIA AND MARKINGS

GENERAL

6. In selecting the area for use as an LZ, due consideration must be given to the type of op, urgency of the mission, the safe delivery of personnel/equipment, natural and man-made hazards and obstructions, safety of flight, and A/C operational limitations.

TYPES OF LZ

7. The types of landing zones are:

a. **Battle LZ**. An LZ of opportunity that meets criteria at figure 11-2-1 and that, in the judgement of the AL Comd, will permit mission accomplishment. This may require use of maximum performance characteristics of the A/C. A construction/engineer effort will normally not be required.

b. **Forward LZ**. An LZ that meets the criteria at figure 11-2-1. These LZ will allow delivery of substantial payloads. Construction/engineer effort will be kept to a minimum by selecting suitable terrain and by fully utilizing A/C performance characteristics.

c. **Support LZ**. An LZ that meets the criteria at figure 11-2-1. These LZ will allow delivery of substantial payloads for a sustained all-weather op. Construction will provide for use during most weather conditions.

8. **LZ Criteria and Terms**. An explanation of the LZ criteria and terms is represented in the figures at Annexes A and B.

9. **Landing Zone Markings**. Specific details will be agreed upon at the joint planning conference as to the type and location of LZ markings and identification procedures. Due account must be given to any agreements covering items such as airfield portable markings. This information must be clearly given at a final briefing to all ground and aircrew members. Visual code identifiers selected from the letters A, C, J, R and S may be used for each established LZ. The minimum acceptable size of the code identifiers is 6 m (20 ft) by 6 m (20 ft), with a desirable size of 14 m (45 ft) by 14 m (45 ft). All LZ markings are to be secured to the ground so as to be unaffected by A/C prop wash/jet blast.

a. **Day Markings**. Runway markings will normally be panels secured to the ground, positioned to indicate the boundaries of the usable runway and raised to enhance visual acquisition on the final approach. They may, however, be of any suitable material of similar size. Code identifiers and runway markers should be of a colour to contrast with the surrounding terrain. The desired layout is shown at Annex C.

b. **Night Markings**. Lights/reflector panels are to be utilized as markers, and positioned to indicate the boundaries of the usable runway. The desired layout is shown at Annex D.

10. **Size and Terrain**. Tactical LZ used for combat ops must be of sufficient size to permit rapid landing, loading/off-loading and take-off. The terrain may be sod, dirt, gravel, compacted snow or ice. Careful consideration must be given to the strength of the surface and the number of landings allowable. Prior to operating into an austere airfield, a thorough ground inspection, as directed by the air commander, shall be made to ensure that it is suitable for the planned op.

11. **Airfield Assessment Factors**. The fluid situation in an air-land op may invalidate many pre-planned factors. Under these conditions, A/C capabilities must be carefully evaluated. The following factors will be assessed:

a. Security of the operating area.

b. Terrain/obstacle features along the approach/departure path.

c. Runway turn-around, taxi and parking surface conditions.

d. A/C weight, local temperatures and airfield elevation.

e. Usable runway length and width.

f. Runway acceleration/deceleration conditions.

g. Surface winds.

h. Airfield control (communications and navigational aids).

12. **Ice Strips**. A/C ops on ice and snow strips shall be conducted in accordance with CFACM 10-100.

13. **Runway Length Criteria**.

a. **Battle LZ**. The AL Comd will determine the runway length required for a Battle LZ according to the circumstances.

b. **Forward and Support LZ**. The runway lengths given at figure 11-2-1 for Forward and Support LZ are calculated for mean sea level (MSL) and international standard atmosphere (ISA) conditions. Differences in LZ elevation and/or atmosphere (particularly temperature) conditions will require adjustments in runway lengths. The AL Comd will increase the runway length as required.

14. **Roughness Tolerances and Obstacle Clearances**. The following items may be used as a guide in determining suitability of runway surface, shoulders and clear areas. Tolerance of roughness will depend upon the shear strength, hardness and size of the tiers that cause roughness. Roughness interrupts smooth rotation of A/C tires and interferes with aerodynamic lift of flight control capabilities at low speeds. The location and frequency of surface crest or wave tops are of paramount importance. Exceeding these limits may result in structural failures to the A/C. Roughness should be minimized for sustained ops using criteria detailed in the following paragraphs.

a. **Grade Changes**. Longitudinal grade changes in the first 152 m (500 ft) from either end of the runway should be avoided. After these sections, grade changes should not occur more than twice in any given 122 m (400 ft). Transverse grade changes should be consistent with the provision for drainage.

b. **Rocks**. Rocks in traffic areas must be removed, imbedded or interlaced so the A/C tires will traverse the area without causing displacements. Loose rocks normally need not be removed from runway clear areas and shoulders unless they exceed 10 cm (4 in) in diameter.

c. **Soil Balls Dried Cohesive Dirt Clods**. Soil balls or dried dirt clods (clay excluded) up to 25 cm (10 in) in diameter that will burst upon tire impact can be allowed. Hardened clay clods may have similar characteristics as rocks and may not exceed 10 cm (4 in) in diameter.

d. **Tree Stumps**. All stumps must be removed from areas receiving traffic. In runway clear areas and shoulders, all stumps will be cut to within 5 cm (2 in) of the ground.

e. **Ditches**. Ditches must be eliminated from traffic areas. When filled, the bearing strength must approximate that of surrounding soil. Edge slope of essential drainage ditches in clear areas and clear zones may exceed the maximum grades for these areas, but should not exceed 10 percent.

f. **Ploughed Fields**. Contours of dirt patterns established to reduce corrosion, water drain-off and planting preparation, which have been accomplished by agricultural ploughing, usually contain a soft core and normally will not require removal.

g. **Ruts**. Rut limitation is a function of their orientation and depth, and the soil bearing strength.

h. **Depression and Soil Mounds**. Depressions and soil mounds do not have sharp corners and are recognized as oval or circular with gradual downward sinks or rises. Depressions or mounds that exceed 38 cm (15 in) across the top and 15 cm (6 in) in depth or height will be filled or levelled until they meet grade tolerance criteria.

i. **Potholes**. Potholes are circular or oval in shape and are distinguished from depressions because of their smaller size and sharp-angled edges. Potholes must be filled if they exceed 38 cm (15 in) across their widest point and 15 cm (6 in) in depth. A pothole may not be located closer than 6 m (20 ft) to another pothole.

j. **Clear Zones**. Taxiway and parking site clear areas will be clear of all obstacles (other than approved markers), higher than 15 cm (5 in) AGL.

SECTION 3
DROP ZONE/LANDING ZONE CRITERIA

DZ/LZ COMMAND AND CONTROL

15. The DZ/LZ Controller has command and control of the DZ and/or LZ.

16. A DZ/LZ control team is required for all peacetime tactical airlift training, except in special cases such as pathfinder drops, for which the AB Force Comd may decide otherwise. For normal peacetime training exercises, whenever land forces or equipment are deployed, the composition of the DZ/LZ control team shall be according to CFACM 60-2630. For continuation training and mini-tactical air transport exercises (mini-TATEXs), the composition of the DZ/LZ control team shall be at the discretion of the AL Comd.

17. The DZ/LZ Controller is responsible for:

a. Forwarding of the PI(s) coordinates to the AL Comd or his representative as required.

b. Placing visual aids to provide adequate identification of the area.

c. Ensuring the safety of the zone. The DZ/LZ controller will issue final approval, prior to tactical airlift ops, in regards to the capability to accept parachutists, para-dropped equipment or air-landed ops.

d. Air-ground-air communications between the DZ/LZ and the A/C.

e. Providing drop score and damage assessment. Information will be recorded and forwarded to the AL Comd or his representative in accordance with Chapter 3, Section 6.

f. Recovering personnel and equipment from the zone.

DZ/LZ SELECTION

18. The selection of a DZ/LZ is a joint responsibility of the AB Force Comd and the AL Comd or their representatives. The decisions will be based upon the tactical situation and A/C operating limitations and must adhere to the following:

a. **Selection of Direction of Run-in**. The selection of the run-in to the DZ/LZ is the responsibility of the AL Comd.

b. **Selection of Marking Aids and Equipment**. The AL Comd, in coordination with the AB Force Comd, is responsible for selecting marking equipment and

electronic marking aids from what is available to the force embarking the DZ/LZ.

c. **Sequence of Dropping**. The sequence of dropping, as between troops and cargo, and the establishment of any time delays between troops and cargo, are to be agreed between the AB Force Comd and the AL Comd.

19. Some of the factors affecting the DZ/LZ selection are:

a. type of op;

b. mission priority;

c. proximity to the objective;

d. enemy disposition/capability;

e. identification from the air;

f. surface;

g. hazards;

h. location and spacing relative to other DZ/LZs;

i. size of area relative to the size of force and amount of equipment to be dropped;

j. other A/C traffic;

k. A/C and equipment limitations;

l. availability and/or acquisition of reconnaissance/intelligence information including maps/photographs;

m. friendly forces support;

n. weather and climatic considerations; and

o. suitability of approach and escape routes with respect to terrain clearance, identifiable ground features, navigational aids, obstacles and run-in direction with respect to position of the sun.

NOTE

In windy conditions, small DZs may be sheltered; therefore, the reported surface wind may not be an accurate representation of actual conditions. Drop altitude winds must be monitored to determine if such a circumstance exists. Errors in drop accuracy may result, especially at higher drop altitudes.

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ANNEX A
TACTICAL LANDING ZONE CRITERIA—CC-130 AIRCRAFT

STRIP COMPONENT	PARAMETER	BATTLE	TYPES FORWARD	SUPPORT
Runways	Length		762m (2500 ft)	1067m (3500 ft)
	Width	18.3m (60 ft)	18.3m (60 ft)	18.3m (60 ft)
	Longitudinal Gradient	0 ± 3%	0 ± 3%	0 ± 3%
	CBR	3+	5+	10+
Shoulders	Width	3m (10 ft)	3m (10 ft)	3m (10 ft)
Clear Area	Width	11m (35 ft)	11m (35 ft)	11m (35 ft)
Overruns	Length	30m (100 ft)	91m (300 ft)	91m (300 ft)
	Width	18m (50 ft)	18m (50 ft)	18m (50 ft)
Lateral Safety Zones	Width	23m (75 ft)	23m (75 ft)	23m (75 ft)
Runway Clear Zones	Length	152m (500 ft)	152m (500 ft)	152m (500 ft)
	Inner Width	45m (150 ft)	45m (150 ft)	45m (150 ft)
	Outer Width	91m (300 ft)	91m (300 ft)	91m (300 ft)
Taxiways	Length	Variable	Variable	Variable
	Width:			
	Straight Section	9m (30 ft)	9m (30 ft)	11m (36 ft)
	Turn Radii	21m (70 ft)	21m (70 ft)	21m (70 ft)
	Clearance from Runway Center-Line to Taxiway Edge	75m (245 ft)	75m (245 ft)	75m (245 ft)
Clear Areas	Width	20m (65 ft)	20m (65 ft)	20m (65 ft)
Shoulders	Width	3m (10 ft)	3m (10 ft)	3m (10 ft)
Aircraft Apron Parking	Length per Aircraft	N/A	44m (143 ft)	44m (143 ft)
	Width	N/A	46m (150 ft)	46m (150 ft)
	Clearance from Apron Edge to Fixed Obstacles	N/A	20m (65 ft)	20m (65 ft)

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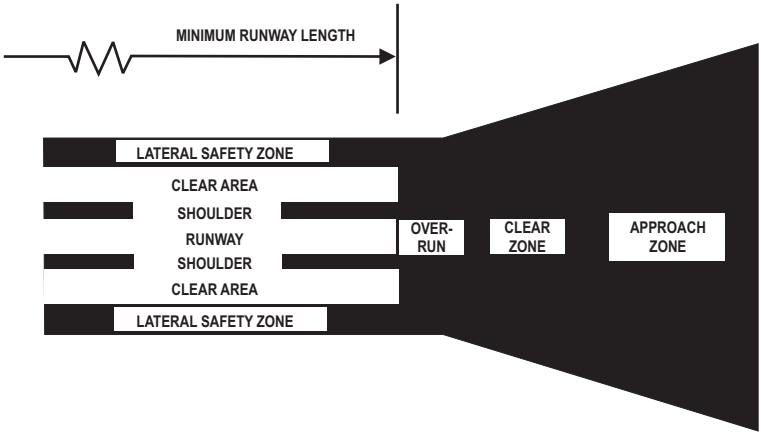
ANNEX B
LZ CRITERIA AND TERMS



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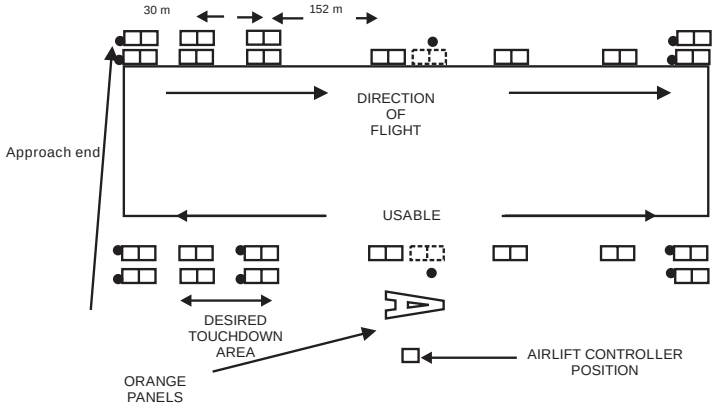
ANNEX C
LANDING ZONE MARKINGS (DAY)



NOTES:

1. Code identifiers and runway markers should be of a colour to contrast with the surrounding terrain.
2. First cerise panels are dual, located 30 meters (100 ft) down from the approach end of the usable runway.
3. The second sets of cerise panels are placed 122 meters (400 ft) down from the first.
4. All subsequent panels are a maximum of 152 meters (500 ft) apart.
5. Runway markers should be raised to enhance acquisition on final approach.
6. Minimum markings are designated thus .
7. Half-runway-length markers are to be used when only min markings are displayed.

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ANNEX D
LANDING ZONE MAKINGS (NIGHT)