DAMAGE CONTROL INSTRUCTION

DCI 01/22

CARBON FIBRE FIRE DAMAGE CONTROL ORGANIZATION AND RESPONSE TO EMERGENCIES

References

References: A. C-05-040-012/TS-001 Post aircraft crash/Accident release of carbon fibre
B. CFCD 132 RCN Damage Control Manual
C. SSOs AL11 (O)
D. 12 Wing Shearwater Emergency Response Plan - Chap 113 - Composition Material Emergency
E. NFPA 1851 Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Firefighting and Proximity Fire Fighting
F. C-87-040-000/MS-001 Respiratory Protection Program CFTO
G. Canadian Forces Fire Marshal Directive FMD 1020, Annex A: Decontamination Guide- Post Firefighting Operations

Purpose

1. The aim of this DCI is to provide guidance for Casualty Clearing Teams to recover casualties safely and effectively decontaminate them. Also to provide guidance to Helicopter Crash Rescue Personnel (HCRP), HCR: Backups, Firefighters, Sector Commander and FLYCO, when cleaning and undressing after exposure to carbon fibre from an aviation incident.

Scope

2. Damage Control Instruction 01/22 promulgates the interim direction to bring in the above references to our navy, defining the equipment to be used by personnel involved with combating fires that may produce carbon fibres as well as the equipment for those providing casualty support to evacuated persons and HCRP in response to internal battle emergencies. This DCI will be incorporated into CFCD 132 – RCN Damage Control Manual, Ship's Standing Orders and Causality Clearing guidance policy.

Background

3. As ships transitioned to flying operations with carbon fibre aircraft, the hazards present due to carbon fibre dust alter the risk profile for those providing casualty support.

Amendments

4. Carbon fibre dust causes mechanical abrasion of the skin and eyes; however, the dusts are not carcinogenic and do not appear to be sensitizers. The lungs can be protected from these fibres by measures used for nuisance dusts. Firefighting ensemble (FFE) with self-contained breathing

apparatus (SCBA) is sufficient protection from fires involving carbon fibre structures. Personnel working in the vicinity of free carbon fibres or suspected free carbon fibres and in post helicopter fire clean up as well as Casualty Clearing Team members, shall wear Personal Protective Equipment (PPE) in accordance with CF H Svc Policy on carbon fibres. This shall include:

a. Disposable Industrial Dust Mask (referred to as N95 mask) or a Reusable Half Face Piece Respirator; Fit testing required IAW Respiratory Protection Program CFTO C-87-040-000/MS-001 can be done using SCBA fit test equipment, however proper training must be completed by the tester prior to administering N-95 fit test.

b. Eye Protection against dust;

c. Leather Gloves (or rubber gloves if handling liquid);

d. Military issued safety boots;

e. Disposable coveralls (NSN 8415-21-899-2631 are recommended); and

f. Miscellaneous PPE which includes antiseptic hand-wipe, respirator cleaning wipes, masking tape for sealing ankle and wrist cuffs when necessary.

g. 6 x Disposable coveralls for casualties who may require decontamination which includes removal of their outer layer of clothing.

5. The process of immobilizing free carbon fibres using an agent, known as fixing, shall be done as soon as possible following the completion of firefighting activities. Water and AFFF are useful temporary fixants readily available on board ship. Deck wax can be applied as a longer term fixant or the area can be covered with plastic sheeting and tape until the debris is removed.

Personnel Protective Equipment (Task)

6. **Helo-Crash Rescue personnel (Firefighters):**

a. Full Firefighter protective ensemble (Bunker Gear), flash hood, and gloves; and

b. SCBA.

7. **Casualty Clearing Team:**

a. N-95 particulate mask or Half-Face Respirator with approved N-95 filters;

b. Eye goggles; and

c. Disposable coveralls.

8. **Salvage / Recovery / Flight Safety** level of dress will be determined by the Recovery and Salvage Officer (RASO) who will indicate and assign hazard zones and safety precautions most suitable to the situation. At a minimum Recovery and Salvage Personnel should wear the following PPE:

a. High Hazard Zone/ Initial RASO Assessment:

i. Disposable coveralls;

ii. Heavy footwear;

iii. Gloves;

iv. Goggles; and

v. HEPA respirators (not dust masks).

b. Low Hazard Zone:

i. Disposable coveralls;

ii. Heavy footwear;

iii. Gloves; and

iv. N-95 particulate mask or Half-Face Respirator with approved N-95 filters.

Decontamination Process

9. The following process details the decontamination procedure when handling a casualty requiring urgent medical intervention:

a. Casualty received by CCT at the designated triage point;

b. CCT member conducts gross decontamination (wet down the casualty) with partially open fresh water hose;

c. remove casualty's contaminated garments;

d. transfer casualty to CCT for medical treatment; and

e. casualties contaminated garments shall be bagged and decontaminated prior to further handling, relocation to another area or disposal.

10. The following process details decontamination for ambulatory personnel involved in an incident, the response or the recovery who have been exposed to carbon fibres, but do not require medical intervention:

a. Member exits through decontamination area;

b. CCT members assigned to decontamination will use HEPA vacuum to remove carbon fibre contamination from outer clothing, work gloves, books and head gear;

c. Respiratory protection is to remain in place until the last step in the decontamination process;

d. Remove disposable coveralls by peeling clothing outward taking care to ensure contaminated exterior surfaces do not fold onto interior surfaces;

e. Place in a sealable container for disposal as hazardous waste;

f. Reusable coveralls/outer garments shall be segregated for inspection and decontamination prior to being returned to service; and

g. Immediately prior to leaving the decontamination area remove respiratory protection and place in suitable container for disposal or decontamination.

11. **HCRP Decontamination**: Utilize the decontamination process as outlined in Para 10, followed by the Wet or Dry firefighter decontamination procedure outlined in reference G in order to reduce unnecessary long-term exposure to carcinogenic by-products of combustion associated with fire suppression operations. Wet/Dry decontamination procedures will be to the discretion of FLYCO.

12. Upon conclusion of fire suppression operations, Firefighter protective ensemble is to be sent out for industrial cleaning and inspection by a qualified contractor to verify equipment serviceability IAW NFPA 1851 Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Firefighting and Proximity Fire Fighting.

13. **FWD CCT Decontamination**: CCT members assigned to decontamination, are to independently complete decontamination process as outlined in Para 10.

Emergency Flying Stations and Crash on Deck

14. Two members from the FWD CCT are to be dressed IAW this DCI and be in charge of the cleaning and removal of gear from causalities extracted from the helicopter. CCT is required to close up upon hearing the pipe “Emergency Flying Station” from Command. Upon hearing crash on deck, CCT will proceed with caution to the hangar. No persons shall enter the hangar until the pipe “Fire fighters take action” is heard. At this point rotors are stopped and the CCT is

able to move to the STBD Lobby or designated triage point, position triage area clear from smoke, and prepare to receive casualties from HCRP.

Implementation

15. This DCI is effective immediately. All shipboard personnel are to familiarize themselves with the above amended direction and apply it to both DC exercises and actual DC events. Sea Training personnel and DC instructors at the Naval Fleet schools are to incorporate the contents of this DCI into their training plans. Purchasing requirements in order to comply with this DCI shall be approved as such. Sea Training validation of the above procedural changes will not occur until 30 Days after the publish date of this DCI in order to allow ships to transition. This DCI will be cancelled upon release of updates to CFCD 132.

Points of Contact

Local Sea Training Representatives
NFR SSO SWIP – LCdr J. Everett
NFR SO DC – CPO1 D. Plourde

Annex A: PPE Decontamination Process Example

The Incident Commander (PC or officer in charge) will determine whether a wet or dry decontamination process will be followed. Both wet and dry decontamination processes are followed by a general post-decontamination procedure.

Decontamination Procedure - Wet

Wet decontamination procedure consists of the following:

1. Ensure proper PPE is worn by both the firefighter being decontaminated and the firefighter conducting the decontamination. Both must stay on air during the decontamination process to prevent inhalation of harmful particles and gasses;

2. Start at the top of the head, brush visible contaminants from firefighting ensemble, using a soft bristled brush to assist removing excessive debris and dirt/contamination;

3. Rinse down with water, NOT from foam line on apparatus;

4. Wash firefighting ensemble using brush, mild soap and water;

5. Rinse down with water;

6. Remove firefighter gloves, wash hands with wet wipes, don nitrile gloves;



7. Remove helmet, bunker jacket, lower flash hood, come off air and remove facepiece and flash hood;



8. Wash nitrile gloves with wet wipe;

9. Wash face, neck, ears, hair, wrist, forearms with clean wet wipe;



10. Don N95 particulate mask; and

11. Finish with general decontamination procedure, as outlined below.

Decontamination Procedure - Dry

Dry decontamination procedure consists of the following:

1. Ensure proper PPE is worn by both the firefighter being decontaminated and the firefighter conducting the decontamination. Both must stay on air during the decontamination process to prevent inhalation of harmful particles and gasses;

2. Start at the top of the head, brush visible contaminants from firefighting ensemble, using a dry soft bristled brush to assist removing excessive debris and dirt/contamination;

3. Remove firefighter gloves, wash hands with wet wipes, don nitrile gloves;



4. Remove helmet, bunker jacket, lower flash hood, come off air and remove facepiece and flash hood;



5. Wash nitrile gloves with wet wipe;

6. Wash face, neck, ears, wrist, forearms with clean wet wipe;



7. Don N95 particulate mask; and

8. Finish with general decontamination procedure, as outlined below.

Post Decontamination Procedure - General

Both wet and dry decontamination procedures must be followed by a general post-decontamination procedure:

1. Clean firefighter ancillary equipment on scene or at the fire station prior to putting back into service;

2. Place firefighter ensemble into a clear plastic bag and seal for transport back to the fire station;

3. Bag SCBA for transportation. SCBA is to be fully washed and sanitized upon return to the fire station;

4. Boots and all other PPE will be thoroughly decontaminated at fire station as per NFPA 1851 and/or manufacturers specifications; and

5. Firefighters shall shower and change into clean station-wear within 60 minutes upon return to the fire station