Northern Ireland
Fire & Rescue Service

Protecting Our Community

Breathing Apparatus Refresher (BAR) 1-Day Pre-learning Material

Scenario-based Training.

Version - 1.0

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Prepared by: Learning & Development Centre.

Version Control Record

NOTES

VERSION No	ACTION	PREPARED BY	APPROVED BY	DATE ISSUED
1.0	Initial Release	SC Lockhart WC McDonagh CC McIlwaine	GC Johnston	14.06.19

CONTENT

NOTES

1. Introduction & Rationale for Pre-learning

The new BAR 1-day training course has been introduced to satisfy a number of organisational needs (these are highlighted in Service Support Memorandum SSM 05/2019). Whilst the general content of the BA training has remained unchanged, the main modifications are;

- 1-day duration.
- Limited Classroom/Theoretical Input
- Focus on Practical /Scenario-based Training.

The 'Theoretical Knowledge' and 'Practical Elements' which form the content of the training day (and which are detailed in the following sections) are aligned with National Occupational Standards (NOS) and follow national best practice.

2. Overview of BA 1-Day Training Programme

The Training Programme will run between (09:00-17:00) and will comprise 4 training sessions (1-4), 4 breaks and a final debrief session (5). See below table for basic detail;

Session 1	Course Induction, Knowledge Assessment, BA Set Test, Fault Identification, Ex. Safety Brief
Break	
Session 2	Initial Confirmation Exercise covering a range of general BA procedures including Telemetry Board.
Break	
Session 3	Micro-teach Session with 5 stages: Entanglement, FF Extrication, Restricted Space and Ease/Donor Set & UCD.
Break	
Session 4	Final Exercise covering a range of BA procedures including, Telemetry Board, UCD and Guidelines.
Break	
Session 5	Course Debrief, Learning Outcomes Confirmed, Performance / Development Issues Addressed.
NB: Timings and duration of breaks may be flexible provided that the course content is fully completed.	

The following sections provide detail of the theoretical knowledge and practical skills that a BA wearer would be expected to possess in order to successfully complete the BAR 1-day course. The detail in the following section has been provided to assist students and save time accessing the wide range of NIFRS BA Training notes. However, the location of the information has been provided for ease of reference.

NOTES

2. THEORETICAL KNOWLEDGE

NOS: K1 – The anatomy & physiology of respiration in relation to use of breathing apparatus. (NIFRS STN – BA12)

Q. State the average breathing rate of an average person.

- 12 – 15 breaths per minute (Page 7)

Q. What percentage of oxygen is contained within inhaled air?

- 21% (Page 6)

Q. What percentage of oxygen is contained within exhaled air?

- 17% (Page 6)

Q. What percentage of Carbon Dioxide is contained within exhaled air?

- 4% (Page 6)

NOS: K2 – The effects of exertion in relation to consumption of air and the use of breathing apparatus. (NIFRS STN – BA13)

Q. State the 3 headings of symptoms that effects of heat and humidity on the body can lead to.

- Heat exhaustion
- Heat syncope
- Heat stroke.

(Page 7)

Q. State symptoms of heat exhaustion.

- Headaches
- Dizziness
- Nausea and vomiting
- Muscle weakness or cramps
- Stomach cramps
- Tiredness
- Loss of appetite
- Skin paler than normal
- Weak pulse
- High temperature.

(Page 7/8)

Q. Define heat syncope.

- Heat syncope occurs due to temperatures above normal body temperatures dilating the skin vessels, which fill with blood.
- The blood will take heat in instead of giving off. If this conduction becomes extreme, the blood pressure will drop causing insufficient blood circulation to the brain.
- Less Blood = Less Oxygen = Fainting

(Page 8)

NOTES

Q. List the components of heat stroke

- Symptoms of heat exhaustion
- Confusion and disorientation
- Visual hallucinations
- Convulsions (uncontrolled muscle twitching)
- Unconsciousness
- Racing, thumping pulse.

(Page 9)

Q. State the factors that may affect air consumption of a B.A. wearer.

- The work rate of the wearer
- His/her physique
- The environmental conditions in which he/she is working
- The pneumatic integrity of the BA set
- The personal protective equipment worn
- Psychological and physiological stress.

(BA 04a Page 7)

NOS: K4 – The capabilities and limitations of the breathing apparatus set. (NIFRS – BA03, BA04a)

Q. Define the term **Full Duration** regarding the wearing of breathing apparatus.

- The period during which breathing apparatus is expected to provide respiratory protection from the moment the cylinder valve is opened until the cylinder content is exhausted.

Q. Define the term **Working Duration** regarding the wearing of breathing apparatus.

- The period during which breathing apparatus is expected to provide respiratory protection from the moment the cylinder valve is opened until the moment at which the low-pressure warning signal starts to operate.

Q. Define the term **Safety Margin** regarding the wearing of breathing apparatus.

NOTES

- The period from the moment the low-pressure warning signal starts to operate until the cylinder content is exhausted.

(BA 04a Page 5)

Q. List the faults that determine when a BA set would be deemed defective and immediately taken out of operational service.

- Back plate is cracked or broken
- Harness has defective straps/buckles
- Cylinder strap torn or cam-lock mechanism damaged
- Cylinder connector O-ring seal missing
- Bronze barrel filter missing
- Cylinder connector compression seal defective
- Cylinder reducer blank caps missing
- Cylinder reducer pressure relief valve continuously venting
- Defective air hose tubing such as cuts, scorch damage, bulging
- Black protective cover damaged or missing
- Test button not engaging
- Supplementary flow function continuously operating
- Missing or damaged O-ring seal on LDV Plus
- Electronic failure of bodyguard unit
- High pressure leak test failure
- Non operation of backlight on bodyguard unit
- Defective 'Active Bodyguard' LED
- Cracked visor on facemask, mushroom valves missing or ori-nasal mask defective
- Defective personal Line, Tenax clip defective

(BA 03 Page 24)

Q. After a BA set is worn for operational or training purposes all components of the set must be thoroughly cleaned using what?

- Warm soapy water then rinsed with fresh clean water.
  (BA 03 Page 24)

Q. What is the purpose of the first stage reducer when high pressure enters the system at 300 bar?

- To reduce the pressure to range of between 6 to 9 bar.
  (BA 03 Page 13)

NOS: K5 the operating features of:

- **K5.1 The breathing apparatus set**
- **K5.2 Ancillary equipment**
- **K5.3 Communications equipment**
- **K5.4 Breathing apparatus entry control recording equipment.**

NOTES

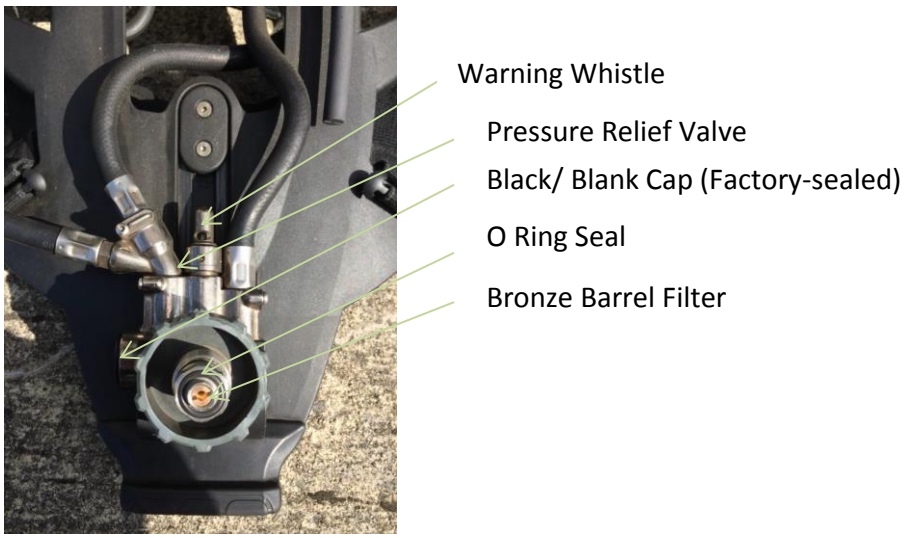
(NIFRS STN – BA02, BA03, BA04b, BA05a, BA 05b, BA05c, BA05d, BA20)

Q. The Ori-nasal mask is fitted with two mushroom valves that are fitted to allow the flow of fresh air from the outer dead space to the inner space and the wearer's lungs. This also helps to reduce the build up of what gas?

- CO^2 (BA02 Page 9)

Q. Label the following 5 items on the reducer assembly.

- Medium pressure reducer- pressure relief valve (PRV)
- Reducer Black/Blank Cap - this is a factory-sealed unit and must not be tampered with by unauthorised person.
- O Ring Seal (Compression Seal)
- Bronze Barrel Filter
- Warning Whistle



(BA03 Page 13)

Q. Label the components of the FPS 7000 facemask. (BA02 Page 7)

Q. List the components of the Dräger PSS 7000 set.

- Backplate
- Harness
- Cylinder Strap and camlock buckle
- Cylinder connector
- Reducer assembly
- Air tubing
- Lung demand valve
- Bodyguard 7000 EMU (Electronic Monitoring Unit)

(BA03 Page 5)

Q. When reporting to BAECO for 'First Entry' into a risk, what is the minimum cylinder content required?

- 240 bar (BA04a Page 6)

Q. Minimum pressure required for 'Re-entry' is cylinder contents of how many bar?

- 150 bar (BA04a Page 6)

Q. Detail the information that should be recorded by BAECO on the telemetry board panel when tasked to perform this duty?

- BAECO name
- Incident address
- ECP number
- Stage
- Time board was established.

(BA05a Page 7)

Q. What action should be taken if a BA set is not fitted with an anti-entanglement device?

- Taken off the run with immediate effect and an anti-entanglement device requisitioned from Technical department. (BA03 Page 11)

Q. Name the two types of Lung Demand Valve used within NIFRS.

- LDV ESA
- LDV Plus

(BA03 Page 16)

NOTES

Q. When MUST the black protective cover be removed on a LDV?

- If entering HI-EX Foam. (BA03 Page 18)

Q. The automatic DSU will activate a pre-alarm if no motion is detected for a period of how long?

- 21-25 Secs. (BA03 Page 21)

Q. How long will the pre-alarm on the DSU continue until full activation?

- 8 Secs. (BA03 Page 21)

Q. What is the capacity of air contained in a Dräger 300 bar CFR 9 litre cylinder when charged to 300 bar?

- 2430 litres of air (BA04b Page 5)

Q. When batteries full charged an Entry Control Board has a minimum duration of how long?

- 8 hours (BA05a Page 6)

Q. What functions can be carried out whilst the telemetry board is in Sleep Mode?

- Quit
- Board test
- Re-program BA tally
- Date set
- Time set

(BA05b Page5)

Q. What functions can be carried out whilst the telemetry board is in Active Mode?

- Forced log on
- Quit
- Forced log off

(BA05b Page 11)

Q. When should manual control procedures be used on the telemetry board?

- When one or all of the team are unable to obtain a successful telemetry log on. (BA05c Page 5)

Q. How often does the telemetry board update electronically when in use?

- Every 20 secs. (BA05d Page 6)

NOS: K6 the testing and checks applied to the breathing apparatus set and its ancillary equipment

NOTES

Q. On station who can carry out the monthly testing of a BA set?

- Qualified BA wearer (BA07a Page 4)

Q. What is the minimum monthly number of bar usage that a BA set must use within the month?

- 50 bar (BA07a Page 10)

Q. After a monthly test of a BA set the minimum contents of a cylinder should be what?

- 280 bar (BA07a Page 10)

Q. When should a general test be carried out and why?

- At the start of every shift or drill night
- To identify any faults or defects which could compromise the safety of the BA wearer.

(BA07b Page 5)

Q. When conducting a general test a new cylinder should be fitted when the contents are below how many bar?

- 250 bar (BA07b Page13)

Q. A pre-entry test should be carried out immediately prior to use. Why?

- Identify integrity of the facemask seal
- Ensure positive pressure
- Prove supplementary flow
- Confirm low pressure warning signals

(BA07c)

NOS: K7 the roles and responsibilities of breathing apparatus control operative:

Q. Entry control officers, for stage I and stage II levels of control must be what?

- Qualified BA wearers (BA09c Page 4)

Q. BAECO on receipt of a BA wearers tally should check what information is correct?

- Name of wearer
- Cylinder pressure (minimum 240 bar)
- Time in

(BA09g Page 7)

NOS: K8 Breathing Apparatus control systems and their application:

NOTES

Q. State when acceptable to use Rapid Deployment procedures.

- Only in exceptional circumstances where urgent action is required and a limited number of crew members form the initial attendance. (BA09a Page 5)

Q. In the event of failure to upgrade to stage I or stage II entry control procedures the OIC must withdraw the BA Team on Rapid Deployment after how many minutes?

- 20 minutes (BA09d Page 8)

Q. Stage I control procedures are designed to monitor the safety of BA wearers in what type of incidents?

- Small or limited incidents. (BA09f Page 4)

Q. Use of stage II procedures should be applied when?

- The scale of the operations is likely to be protracted or demand greater control and supervision.
- More than two stage I Entry Control Points are necessary
- More than ten BA wearers are committed into risk area at one time
- Branch guidelines in use

(BA09h Page 5)

Q. Main control procedures, on the instruction of the Incident Commander are to be initiated when?

- More than one stage II Entry Control Point in use
- When number of BA wearers are large

(BA09j Page 5)

Q. BA emergency teams shall be established at ALL incidents. When?

- Stage II entry control procedures are in operation
- All other incidents where personnel resources permit

(BA10 Page 5)

Q. The composition and provision of emergency teams will depend on what?

- Nature of incident
- Location of the BA wearers
- Number of BA wearers in the largest teams
- Level of entry control

(BA10 Page 5)

PRACTICAL PROCEDURES

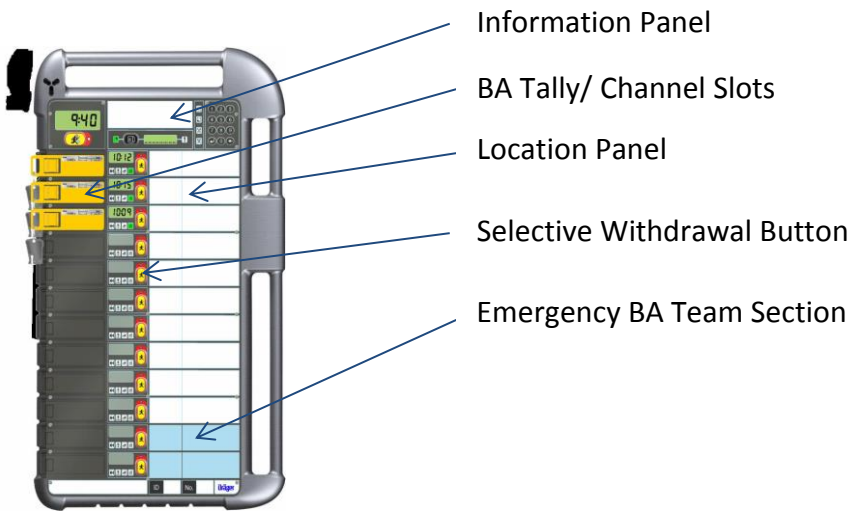
NOTES

During a number of BA practical scenarios students will be required to demonstrate the ability to competently;

• Complete BA Set tests (General, Monthly & Pre-entry).
• Provide and receive a brief as BA wearer or ECO.
• Perform the role of ECO and effectively use the ECO Telemetry Board.
• Conduct a search using appropriate techniques and procedures to locate fire and/or casualty.
• Carry out door procedures and stair procedures.
• Complete UCD procedures.
• Manage air consumption (timely gauge checks).
• Communicate with BA Team members.
• Lay, follow and search off guidelines.

Q. Demonstrate a working knowledge of the features of the PSS Merlin Telemetry Entry Control Board.

- Location Panel, location, tasks, equipment & earliest TOW.
- Emergency BA Team section
- Information Panel, ECO Name, Entry Control Point location, stage, start time
- BA tally/ channel slots
- Selective Withdrawal Button



(BA05a – Page 5)

Q. Demonstrate an understanding of the procedure for searching a building with a large number of search areas.

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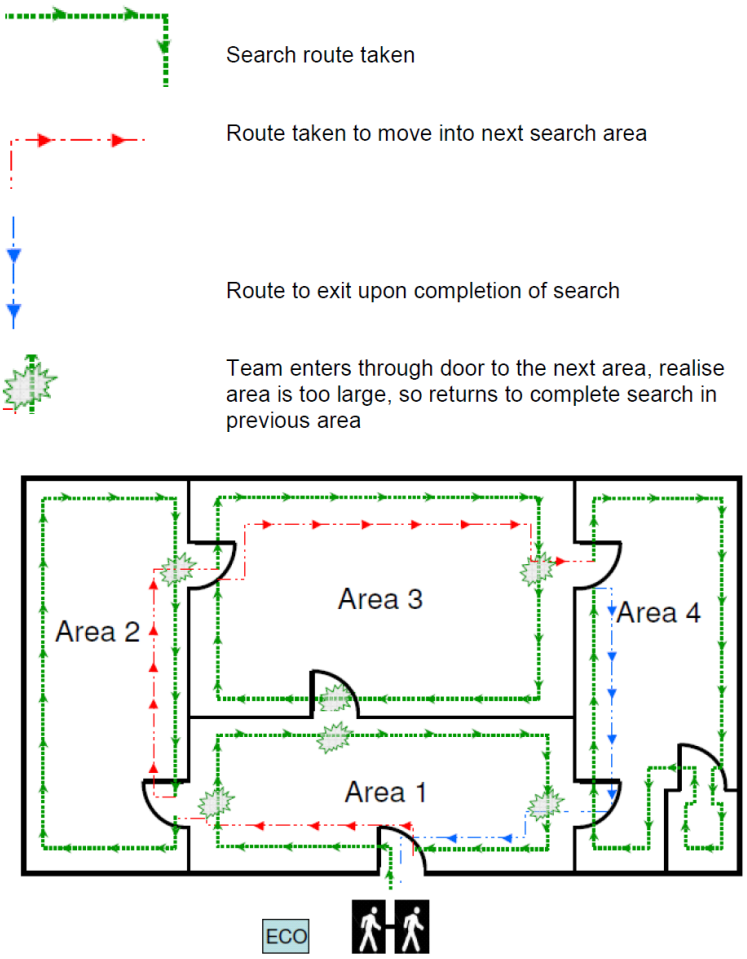
MOVEMENT THROUGH A MULTI-ROOM LAYOUT



(BA 11e Page 10)

Q. Guidelines are to be used only on the instruction of the **Officer in Charge**, state 3 reasons when you may and 1 reason when you must use.

- Entering and searching in thick smoke
- Where premises are flooding and hose lines submerged
- Where the hose has been hauled aloft
- **MUST** = entry into areas of high expansion foam.

(BA11d Page 4)

Q. How many guidelines can be used from a main entry control point?

- A & B (Two)

(BA11d Page 5)

NOTES

Q. How many branch guidelines can be used from a main entry control point?

- Four branch guideline
- 1,2,3,4 (holes on tally)

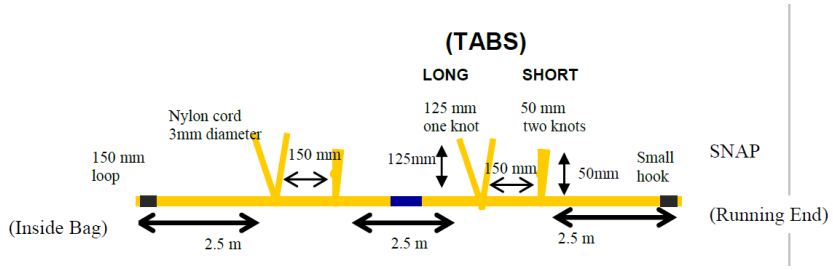
(BA11d Page 5)

Q. What length is a guideline?

- 60m long

(BA11b Page 5)

Q. Guideline Construction, describe in detail a BA Guide Line.



(BA11b Page 5)

Q. Entrapped Procedure – Demonstrate awareness of the actions BA wearers shall take on becoming trapped within a risk area?

- Operate manual DSU
- Stay calm and relax, seated position
- Do not operate supplementary air supply
- Do not adjust the cylinder valve
- Clap hands to attract attention and minimise air use (do not shout)

(BA14a Page 5&6)

Q. UCD Procedure Demonstration.

- STEP 1: Close eyes, don't breathe and sound DSU.
- STEP 2: Lean forward and drop down to right knee.
- STEP 3: Locate and Reconnect LDV.
- STEP 4: Vent Facemask.
- STEP 5: Withdraw from Risk or Initiate Entrapped procedure.
- *STEP 6: BA Set Impounded Post Incident*

(BA14c Page 5&6).

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