COMPASS NAVIGATION/DSMB DEPLOYMENT

Lesson Objectives

This lesson teaches two entirely separate skills. The first part of the lesson teaches the use of the compass to swim on a heading and it's reciprocal. The latter part of the lesson teaches how to deploy a Delayed SMB (DSMB) from the bottom prior to commencing an ascent. The subsequent ascent includes further practice at conducting a decompression stop, using the DSMB line as a reference for circumstances where no other fixed reference is available

Achievement Targets

- At the end of this lesson students should be competent and confident in their ability to use a compass to:
  - Take a compass bearing on a fixed object
  - Follow a compass bearing underwater
  - Return underwater to their starting point by following a reciprocal bearing
- Be competent and confident in their ability to:
  - Deploy a DSMB from the bottom
  - Ascend using a DSMB
  - Conduct a decompression stop using a DSMB

Lesson Contents

For this lesson each diver will need to be equipped with a compass and a DSMB. As the exercises involve the use of lines underwater, each diver should also be equipped with an appropriate and easily accessible knife or other line cutting tool. A large dry area will be required for the initial familiarisation with the compass and it's use. In-water compass exercises will then require fixed markers to swim from and to for the compass navigation exercises. Surface cover should be briefed to expect deployment of a number of DSMBs, one from each diver in the group.

1. Briefing

Explain the above objectives and include all the elements of a SEEDS brief. It is not essential that all elements are covered at this stage, as some will be more productively covered in the dry practice. Those specific to the in-water activities will be more effectively covered after the dry practice exercises. With the involvement of the students, establish the predicted breathing gas requirements to conduct the DSMB exercise and surface with an adequate reserve, and then explain how the exploratory dive part of the lesson will be managed in line with this requirement.

2. Dry practice of compass use

This exercise teaches the basics of handling a compass and develops confidence that, if the student follows what the compass is telling them, they will go in the right direction. It also introduces the concept that navigation may also require a control of distance as well as direction.

At each stage in the exercise, instructors should check that the students have set the correct bearings before moving and that, once on the move, they accurately follow the direction of the lubber line. Any tendency to mishandle the compass will be far easier to correct at this stage than when underwater.

- Setting a bearing

  Compass held so that a sighting of the destination object can be taken along (or parallel to) the lubber line, bezel rotated to align index markers with head of North-seeking needle.

- Following a bearing

  Compass held so that lubber line is directly in front of body and pointing straight ahead, body turned to align bezel index markers with head of North-seeking needle, body/lubber line orientation maintained while walking forward keeping bezel index markers and North-seeking needle aligned.

- Estimating and controlling distance

  Distance between start and destination object measured by counting paces or seconds.

- Setting and following a reciprocal bearing

  On arrival at destination object, bezel index marks rotated to align with tail of North-seeking needle, while maintaining body/lubber line orientation, body turned until bezel index marks again align with head of North-seeking needle. Compass followed on return leg as on outbound. Distance monitored on return leg by walking for as many paces/seconds as counted on outbound leg.

At the end of this exercise, students should be **competent and confident** in their ability to take a compass bearing on a fixed object.

3. Dry practice of DSMB use

Students will already be familiar with some aspects of the equipment from the earlier SMB and distance line lessons. Dry practice should therefore concentrate on those aspects which are specific to the use of the DSMB, particularly those concerned with managing its inflation. A full dry run of the inflation procedure should be performed, wearing gloves if appropriate to local water conditions, so that students can get clear in their minds exactly how they will manage the inflation of the buoy (particularly if it is not self-inflating), while ensuring that the reel is able to run free (but without snagging) as soon as the buoy has sufficient buoyancy. Another student, or an assistant, holding the buoy and exerting a slight pull upwards to represent buoyancy, will give a more realistic representation of the practicalities of the technique.

Report dive plan to Dive Manager.

4. Kit up and buddy check

Prior to kitting up, identify a suitable means by which students could carry the DSMB and reel, ready assembled, and secured in such a way that it is accessible but will not dangle free and become a snag hazard. Ideally this would be fully enclosed in a pocket.

Once fully kitted and normal buddy check have been completed, check that the DSMB can be deployed from its stowage, adjusting the stowage method as necessary.

Check also that the compass is accessible and can be held in such a way that it can be held in the students field of view, not just while standing, but also while in a swimming attitude.

5. Entry

As appropriate to local conditions.

6. Compass use on surface

This is an in-water repeat of the dry exercise to adapt to the different attitude and the implications of swimming, rather than walking, while maintaining the body/lubber line orientation. Because of the increased task loading students should not be expected to manage both direction and distance at the same time. This task should be divided between students, or student and instructor, with one navigating out and back while the other monitors distance.

- Setting and following a bearing

  Bearing set and, following a check of the bearing by the instructor, is followed to a destination object at about 25m distance as in the earlier dry exercise. For reassurance, student can look up to check direction, although this should not be allowed to become a substitute for using the compass

- Estimating and controlling distance

  Diver monitoring distance counts fin strokes or seconds while visually monitoring progress towards destination object

- Setting and following a reciprocal bearing

  As in earlier dry exercise, reciprocal is set by aligning bezel index marks with tail of North-seeking needle, diver turns to establish return direction and, following check of direction by instructor, swims back

  Diver monitoring distance does so using fin strokes or seconds counted during outbound leg (ie. without visual monitoring)

7. Compass use underwater (depth 2 - 6m)

This exercise extends the surface exercise by first removing the ability to look up at the destination object and then progressing to an out and back swim without a destination object at the turning point. This latter exercise simulates the realistic situation of a shore dive where access considerations require an accurate return to the entry point.

- Swim to destination object and return

  This is a direct repeat of the surface exercise using the same start and destination points (ie. bearing and distance the same as the surface exercise) but adapting the technique to take advantage of the bottom conditions ie. sight along lubber line to identify an object on required bearing some distance ahead, swim to object, repeat to identify further object on required bearing etc.

- Out and back swims

  From a suitable starting marker, set compass on bearing (different to that used previously), swim along bearing for pre-determined time, set reciprocal, swim back to starting point

  This exercise should be repeated using a further bearing

During the above exercises each student should have had the opportunity to navigate out and back on at least three different headings/reciprocals, and should have had the opportunity to monitor distance on at least one

At the end of this exercise the students should be fully **competent and confident** in their abilities to use a compass to navigate in a straight line, and to return on a reciprocal to their starting point. Where necessary additional practice should be provided to enable them to achieve this

8. Exploratory dive to a maximum of 20m, ending in approximately 10m

Use the exploratory dive as a demonstration of how the compass can be used as an aid to more general navigation (rather than in a specific direction) and position awareness, and how it can be used to supplement pilotage.

Demonstrate dive profile/air management while positioning for the DSMB exercise with the agreed air state. The exploratory dive should end in approximately 10m of water where a direct ascent to the surface can be performed and where there are no visual references during the ascent.

9. DSMB deployment from bottom - 10m depth

This exercise comprises four elements, the initial inflation of the DSMB, the deployment of the DSMB, the ascent and a practice decompression stop at 6m. The latter differs from the decompression stop practiced in an earlier lesson in that there is no fixed shot line, and consequently the DSMB line becomes the only visual reference. This is the realistic scenario for the ascent, including a safety stop, from a wreck dive as slack water ends.

Self-inflating DSMBs are the easiest to use, but where another source of inflation is required, this should only be from an AS or a dedicated nozzle, not from a diver's main regulator. Where an AS is used, instructors should closely monitor the students actions to ensure that it does not become entangled in the DSMB or it's line.

As instructor and all students will each be deploying a DSMB, instructors should ensure appropriate spacing between all divers to ensure that DSMBs do not become entangled during deployment.

- Initial inflation

  Settled on a clear area of the bottom, DSMB removed from stowage, all attachments to diver disconnected. DSMB and reel held clear of diver and equipment, initial small inflation to straighten buoy, reel unlocked during inflation

- Main inflation and deployment

  Once buoy is fully extended, reel unlocked, DSMB inflated further. *(Note: It is not necessary to fully inflate a DSMB as expansion during the ascent will cause further inflation. Setting self-inflating DSMBs to inflate slowly makes control easier, other DSMBs should be released as soon as diver can no longer remain on the bottom while holding on to the DSMB)*

  Reel held unlocked until it has completely stopped rotating *(Note: the rate at which the line runs out varies as the DSMB may pursue an erratic course to the surface. It is important to ensure that student's do not allow the reel to lock prematurely)*

- Ascent reeling in line

  This element of the exercise is nothing more than a direct repeat of the SMB ascent in the earlier lesson. It provides further practice of controlling buoyancy while operating the reel to maintain a slight tension on the line

- Practice decompression stop at 6m for 1 min.

  At 6m lock reel, adjust buoyancy to maintain depth using line and reel as a visual reference. At end of stop, unlock reel and continue ascent to surface. Inflate BC at surface

At the end of this exercise the students should be fully **competent and confident** in their abilities to deploy a DSMB and to conduct an ascent to the surface including a decompression stop using the DSMB line and reel as the only visual reference

10. Exit

Exit as appropriate to local conditions.

Report back to Dive Manager.

11. Debrief

Review the students' performance, highlighting areas of good performance and offering constructive criticism where necessary. As with skills learned in the preceding lessons, those learned in this lesson will not be needed on every dive. Periodic practice of these skills will therefore be needed to retain them, and to enable students to get more enjoyment out of dives when they are needed and to maximise safety.

Adapting this Lesson

The content of this lesson is not dependant upon equipment or previous training and hence the lesson content is applicable to all students.

Skill Performance Standards

At the end of this lesson, the students should be sufficiently **competent and confident** to be able to achieve the following skill performance standards, without supervision, in the water conditions experienced:

Compass use - using a compass, student was able to take a bearing on an object and then swim underwater on a straight line bearing over a distance of approximately 25m to arrive within approximately 2m of the object. Starting from a fixed underwater object, student was able to swim out on a straight line bearing for approximately 25m, set a reciprocal bearing and then return to within approximately 3m of the starting point.

DSMB use - student removed DSMB from stowage and checked no connections to equipment remained, buoy and reel managed to avoid entanglement of line around either buoy/reel or other equipment. Initial inflation to straighten buoy, reel unlocked. Buoy released during main inflation before increasing buoyancy resulted in student being lifted from the bottom, buoy released cleanly with no entanglement of line around equipment. Reel held unlocked until rotation completely stopped. Appropriate tension held on line during ascent, buoyancy controlled to maintain normal ascent rate. Reel locked at safety stop depth. Buoyancy adjusted to maintain safety stop within 1m of required depth and accurately timed. Line tension managed during final ascent to surface directly under buoy.