Tec 50

Other Delivery Content, Tec 50-1

Study assignment: Tec 50 Handout 1

Learning Objectives

By the end of this section, you should be able to answer this question:

1. What are the options and considerations for long hose gas sharing during the decompression phase of a technical dive?

D. Sharing gas with the long hose is usually a procedure that closes the gap between when the victim loses the gas supply and reaches another independent gas supply or the surface.

1. On a deco dive, if there are stops before the first gas switch, it may be necessary to supply gas to the affected diver on those stops.
2. One advantage of a three person team is that it provides two people to help the one – both divers can provide gas to the victim at various intervals so that neither one has a severely depleted supply.
3. At the first gas switch, the victim can usually dive independently through the rest of the dive.
    a. At the Tec 50 level, air breaks will not usually be needed until after the second gas switch; the affected diver can usually break on the lower oxygen deco gas.
    b. If the first deco gas is EANx50 or higher, however, the diver may need to share gas for air breaks.
    c. At the surface after completing decompression, the victim will usually breathe from a deco cylinder while orally inflating the BCD, but it's a good idea for a team mate to stay ready with the long hose until the victim is out of the water.

Exercise, Other Delivery Content, Tec 50-1

1. Considerations and options for long hose gas sharing on a decompression dive include (choose all that apply):

❑ a. the depth at which the victim switches to the first deco gas.

❑ b. whether the victim will need long hose gas sharing for air breaks.

❑ c. whether the long hose is oxygen compatible.

❑ d. being ready to provide assistance at the surface after completing decompression.

How did you do?

a, b, d.

Other Delivery Content, Tec 50-2

Study assignment: Tec 50 Handout 2

Learning Objectives

By the end of this section, you should be able to answer this question:

1. What are three reasons you may want to "tec dive" in a pool or shallow water?

C. Practice, practice, practice

1. Tec diving involves a lot of motor procedures. A motor procedure is a series of motor skills that you carry out in sequence in response to a need of some kind (routine or emergency).
2. Motor skills erode with disuse, but usually refresh quickly with practice.
3. New situations may call for creating new motor procedures.
4. As a tec diver, you may find it a good idea to practice your tec diving skills in a pool or other shallow, no stop dive situation for these reasons:
   a. To refresh your skills – You already know you need to do this as a recreational diver if you've not been active in awhile. Even if you're active as a tec diver, however, you may want to refresh seldom-used emergency skills. These may include long hose drills, send up lift bags/DSMBs, drift decompression, etc. – whatever skills you may need in an emergency, but have not actually practiced in quite a few dives.
   b. To extend your skills – You may need to apply what already know in a new situation; practicing first may help. For example, if you may have to don and remove deco cylinders in reduced visibility and heavy surface chop while hanging onto a current line, it may be worth practicing doing this with your face entirely underwater and your eyes closed, while hanging onto a line.
   c. To invent mission specific skills – Your dive plan may call for doing something highly specific, such as recovering a lost object. If you don't know the best way to rig the object for recovery, you may want to invent the procedure using a duplicate of it in shallow water.

Exercise, Other Delivery Content, Tec 50-2

1. Reasons you may want to "tec dive" in a pool or shallow water include (choose all that apply):

❑ a. refreshing your skills.
❑ b. teaching yourself to cave dive.
❑ c. to extend your skills to specific situations.
❑ d. to invent mission specific skills.

How did you do?
a, c, d.

Other Delivery Content, Tec 50-3

Study assignment: Tec 50 Handout 3

Learning Objectives

By the end of this section, you should be able to answer these questions:

1. What is trimix?

2. What are the advantages and disadvantages of diving with trimix?

3. What will your qualifications be with respect to diving with trimix as a Tec 50 diver?

A. At depths beyond 30 metres/100 feet, trimix is increasingly advantageous.

1. Trimix is a blend of oxygen, helium and nitrogen.
   a. Much as enriched air nitrox is abbreviated "EANx," trimix is abbreviated "TMx."
   b. Trimix nomenclature is to label a blend with the oxygen and helium content. Example: TMx10.5/50 is 10.5 percent oxygen, 50 percent helium, balance nitrogen
2. The prevailing view is that you use trimix for open water dives deeper than 50 metres/165 feet .
   a. Deeper than 40 metres/130 feet, the prevailing view is that trimix is required for overhead environments or complex open water environments.
   b. Although using air as deep as 50 metres/165 feet for open water diving has a long-standing record of being acceptable, the trend is toward using trimix beginning at shallower depths.
   c. However, air/EANx remains a viable option in the 30 metre/100 foot to 50 metre/165 foot range in open water and reasonable conditions.

B. Advantages and disadvantages of trimix

1. Advantages
   a. Reduced narcosis – Helium is not narcotic, so trimix greatly reduces narcosis. This is particularly important for dives below 50 metres/165 feet, but is useful as shallow as 30 metres/100 feet for complex dives, dealing with poor conditions. It is considered mandatory for overhead environment diving beyond 40 metres/130 feet.

b. Reduced gas density – Helium is a lighter than oxygen and nitrogen so it is easier to breathe under pressure. This reduction in respiratory load is thought to help reduce carbon dioxide buildup by improving respiratory exchange, as well by reducing the muscular effort required to breathe.

c. Reduced oxygen exposure – At depths below 50 metres/165 feet, it becomes increasingly important to reduce the oxygen in a breathing gas. Helium is a better choice than nitrogen for reducing the fraction of oxygen for both its non narcotic and its low gas density properties.

2. Disadvantages

a. Decompression times and schedules – Because helium diffuses more rapidly than nitrogen, you need to use tables or mixed gas dive computers set for the specific trimix you're using.

- All else being equal, within typical tec diving limits, a trimix dive requires more decompression than an air/EANx dive.
- You cannot simply use an air or EANx schedule for trimix, even if the oxygen content is the same.
- Trimix almost always requires accelerated decompression with higher oxygen deco gases.
- Most software and many high end tec diving computers support trimix, so planning your dives does not differ much from what you do as a Tec 50 diver – but you *must* plan for helium.

b. Theoretical DCS risk – Because helium diffuses rapidly, in theory DCS is more likely with helium, particularly following a rapid ascent, a poorly executed or omitted decompression stop, or similar error.

- Recent examination of data does *not* find that this is clearly the case. There may be more risk of DCS Type II (neurological), though this isn't clearly the case either.
- Some argue that helium's rapid diffusion makes it more efficient during decompression.

- Until we know more, the prudent practice is to assume it has less error tolerance and higher risk; tight, well executed dive skills and conservative schedules are part of reducing DCS risk regardless of what gases you're using.
- Although there is some question whether the helium diving has a higher DCS risk, until we know more it is a risk you must accept if you dive trimix.

c. Cost and availability – Helium is expensive, and in some areas, nearly impossible to get.

- Using open circuit scuba, the cost of helium can be significant.
- In some areas, helium isn't available even at a high price.
- For this reason, in some areas trimix isn't commonly used, or used less frequently, for open water dives in the 30 metre/100 foot to 50 metre/165 foot range.

d. Heat loss – Helium absorbs heat rapidly and insulates poorly compared to nitrogen-oxygen. For that reason (among others), you cannot use it in a dry suit. The most common solution is to use a small cylinder with an inflation gas (typically argon) to inflate the dry suit.

3. Note: Using trimix does not make an unsafe dive safe!
   a. Trimix helps offset some of the disadvantages of air/EANx in deep diving, but it does not eliminate risk.
   b. Using trimix does not make it acceptable to dive in poor conditions or situations beyond your experience and skill level. If the site is unsafe for diving with air within air depth limits, pick another site regardless of what gases you're using.

C. Trimix and the Tec 50 certification

1. If your instructor is a DSAT Tec Trimix instructor, you *may* have the option of using trimix on Tec 50 Training Dive Four.
2. Realize that this does *not* certify you or qualify you to dive trimix independently.
3. To dive trimix, continue your training with the Tec Trimix 65 course and/or the Tec Trimix Diver course.

Exercise, Other Delivery Content, Tec 50-3

1. Trimix is a blend of oxygen, helium and nitrogen.

- ❑ True
- ❑ False

2. Advantages of diving with trimix include (choose all that apply):

- ❑ a. reduced narcosis.
- ❑ b. that it is a better insulator in your dry suit.
- ❑ c. it has less density.
- ❑ d. reduced oxygen exposure

3. Disadvantages of diving with trimix include (choose all that apply):

- ❑ a. theoretical DCS risk.
- ❑ b. cost and availability.
- ❑ c. longer decompression times.
- ❑ d. oxygen toxicity.

How did you do?

1. True. 2. a, c, d. 3. a, b, c.