30. Rebreather Full Cave Diver Instructor

30.1 Introduction

The purpose of this program is to evaluate a candidate instructor with respect to the following criteria:

1. Level of knowledge, professionalism and proficiency in presenting a comprehensive TDI Rebreather Cavern Diver, Rebreather Intro to Cave Diver, and Rebreather Full Cave Diver courses.
2. Proficiency in demonstrating the required land and water skills
3. Proficiency in presenting information from academic sessions associated with TDI Rebreather Cave Diving courses
4. Overall attitude toward safety, both for the instructor and their student
5. Reducing the long-term environmental impact of our sport by developing skilled, efficient and well educated divers
6. Possessing a thorough knowledge of the *TDI Standards and Procedures*

30.2 Qualifications of Graduates

Upon successful completion of this program, graduates will be authorized by TDI to teach and certify students in the following areas:

1. TDI Rebreather Cavern Diver course
2. TDI Rebreather Intro to Cave Diver course
3. TDI Rebreather Full Cave Diver course

30.3 Who May Teach

This program may be conducted by the TDI Headquarters Training Staff and/or a senior Instructor Trainer who has been approved by TDI Headquarters to evaluate instructor candidates. The Instructor Trainer must be qualified as an instructor on the TDI approved rebreather they are diving, and as an Air Diluent Decompression Diver (or equivalent) on the TDI approved rebreather the student is diving.

30.4 Student to Instructor Ratio

Academic

1. Unlimited, so long as adequate facility, supplies and time are provided to ensure comprehensive and complete training of subject matter

Overhead Environment Training

1. The maximum candidate to instructor ratio is 3:1

30.5 Student Prerequisites

1. Minimum age 21
2. Be a certified as an open water instructor in active teaching status with an internationally recognized scuba training agency for at least 2 years
3. Be certified as a TDI Rebreather Full Cave Diver or equivalent
4. Provide proof of at least 200 full-cave dives, a minimum of 100 of these dives must be rebreather cave dives.
5. Have a minimum of TDI CCR Air Diluent Decompression Procedures Instructor certification or equivalent
6. Have a minimum of 1 year rebreather teaching experience
7. Have certified a minimum of 25 rebreather divers at any level
8. Provide proof of assisting with at least 2 courses in each of the 3 levels of TDI Rebreather Cave training
9. Provide recommendation from a TDI Rebreather Cave Instructor with whom the candidate has assisted a minimum of 1 course with. This must be an instructor other than the Instructor Trainer conducting the Instructor Evaluation.

Note: An active TDI Full Cave instructor may administratively upgrade to this rating provided the following requirements are met:

1. Certification as an open circuit TDI Full Cave instructor
2. Certified as minimum of TDI Air Diluent CCR – Unit Specific instructor (must be certified TDI Air Diluent Deco CCR instructor if decompression cave dives are conducted)
3. Have issued 5 rebreather certs at any level
4. Provide proof of 20 logged rebreather cave dives
5. Have co-taught two complete Rebreather Full Cave courses with an active TDI Rebreather Full Cave instructor and provide a letter verifying co-teaching activity listing dates and students

30.6 Course Structure and Duration

Water Execution

1. TDI allows the instructor trainers to structure programs accordingly; adequate time to ensure comprehension and ability to perform skills required

Program Structure

1. Candidates must participate in a minimum of 2 TDI supervised rebreather cavern dives
2. Candidates must participate in a minimum of 2 TDI supervised rebreather introductory cave dives
3. Candidates must participate in a minimum of 2 TDI supervised rebreather full cave dives

Duration

1. Minimum time of 45 hours

Limits of Training Dives

1. Cavern Dives:
    a. Diver carries adequate bailout to safely exit from the furthest point of penetration using a minimum SAC rate of 30 litres per minute/1 cubic foot per minute OR the student's calculated elevated SAC rate to account for a CO_2 event, whichever is greater
    b. 60 linear metres / 200 linear feet from the surface
    c. 30 metres / 100 feet maximum depth
    d. No decompression diving
    e. No restrictions; no areas too small for 2 divers to pass side-by-side
    f. Safety stops as appropriate or necessary
    g. Maintain a continuous guideline
    h. Proper cavern diving equipment is used in conjunction with a TDI approved rebreather
    i. No removal of life support equipment shall be permitted within the overhead environment
    j. Visibility must be adequate to identify the exit from inside the cavern

2. Introductory Cave Dives:
    a. Diver carries adequate bailout to safely exit from the furthest point of penetration using a minimum SAC rate of 30 litres per minute/1 cubic foot per minute OR the student's calculated elevated SAC rate to account for a CO_2 event, whichever is greater
    b. 40 metres / 130 feet maximum depth
    c. No decompression diving
    d. Maintain a continuous guideline (no jumps, no gaps)
    e. Proper cave diving equipment is used in conjunction with a TDI approved rebreather
3. Full Cave Dives:
    a. Diver carries adequate bailout to safely exit from the furthest point of penetration and complete any decompression stops using a minimum SAC rate of 30 litres per minute/1 cubic foot per minute OR the student's calculated elevated SAC rate to account for a CO_2 event, whichever is greater
    b. 45 metres / 150 feet maximum depth
    c. No equipment removal in cave
    d. Complete safety and decompression stops as appropriate or necessary
    e. Maintain a continuous guideline
    f. Proper cave diving equipment is used in conjunction with a TDI approved rebreather

30.7 Administrative Requirements

The following are the administrative tasks:

1. Collect the course fees from all the instructor candidates
2. Ensure that the instructor candidates have the required equipment
3. Communicate the training schedule to the instructor candidates
4. Have the instructor candidates:
    a. Complete the *TDI Liability Release and Express Assumption of Risk form*
    b. Submit the *TDI Medical Statement* form signed by a licensed physician

Upon successful completion of the course the instructor trainer must:

1. Issue the appropriate TDI certification by submitting the appropriate *TDI Dive Leader Registration* form to TDI Headquarters

30.8 Required Equipment

Required reading:

1. *TDI Diving in Overhead Environments* Manual
2. *TDI Diving in Overhead Environments* Instructor Guide
3. *TDI Diving in Overhead Environments* Instructor Resource CD (Optional)
4. *TDI Diving Rebreathers* Student Manual
5. *TDI Diving Rebreathers* PowerPoint Presentation (optional)
6. CCR Manufacturer's manual and updates

Suggested reading:

1. *NACD Art of Safe Cave Diving*
2. *Basic Cave Diving – A Blueprint for Survival*
3. *Caverns Measureless to Man* – Sheck Exley

Equipment Requirements

1. A complete TDI approved rebreather
2. Minimum of 1 rebreather enabled computer or PO_2 monitoring device
3. Off board bailout cylinder(s) – volume appropriate for planned dive
4. Bailout regulator(s) equipped with pressure gauge and low pressure off board (quick connect) gas supply hose.
5. Buoyancy compensator device (BCD) with power inflator
6. Exposure suit adequate for diving environment
7. Access to an oxygen analyzer (instructor may supply)
8. Mask and fins
9. Minimum of 2 cutting devices
10. Slate and pencil
11. Three battery powered lights; 1 primary and 2 back-ups, each with a with burn time suitable for the planned dive time
12. Safety reel with a minimum of 37 metres / 125 feet of guideline
13. Gap reel with 15 metres / 50 feet of guideline
14. One primary cave-diving reel with length appropriate for intended dive
15. Computer, watch or bottom timer and depth gauge
16. Slate or wet notes with a pencil
17. Submersible dive tables or backup dive computer
18. Three directional line arrows
19. Three non-directional marker
20. Any staged decompression cylinders must be properly labeled

Note: All the instructor candidates must be in full cave equipment configuration for all water activities.

30.9 Required Subject Areas

1. Policy for Cave Diving
2. Psychological Considerations
3. Equipment Considerations
    a. Bailout cylinder options
        i. Single bailout cylinder vs redundant bailout
        ii. Long hose vs short hose on bailout
    b. Rebreather configuration options
    c. Scrubber options
    d. Buoyancy compensator device (BCD) / harness options
    e. Reel options
    f. Proper weighting
    g. Equipment configurations
4. Communication
    a. Hand signals
    b. Light signals
    c. Touch contact signals
5. Swimming Techniques
    a. Body posture/ trim
    b. Buoyancy control and rebreather weighting
    c. Line following
    d. Propulsion techniques
6. Physiology
    a. Breathing techniques
    b. Stress management
    c. Decompression theory and its application to cave diving
7. Cave Environment
    a. Geology
        i. Bottom
        ii. Ceiling
    b. Local access requirements
    c. Land owner relations
8. Conservation
9. Problem Solving
    a. Emergency procedures
    b. Equipment failure
    c. Silting conditions
10. Accident Analysis
11. Review of Dive Tables and Decompression Theory

12. Cave Diving with Open Circuit Divers
    a. Bailout configuration requirements
    b. Out of air emergencies
13. Cave Diving Etiquette

30.10 Required Skill Performance and Graduation Requirements

At NO point is the student to be unable to monitor their PO_2 while on the loop. Zero visibility drills must be performed in a way that the student may monitor the status of the breathing loop; i.e. no mask but able to monitor HUD, lights out but able to use display back light to view PO_2, etc. Or, the drill must be done on bailout.

The candidates are required to demonstrate the cave diver land/safety drills as described in the *TDI Diving in Overhead Environments* Diver materials. Candidates will teach and encourage cave manners and proper etiquette at all times.

1. How to properly deploy a guideline
2. How to properly follow a guideline
3. Proper use of reels; primary, safety, jump and gap
4. Circuits, traverses, T's, jumps and gaps
5. Use of safety reel in lost diver procedures
6. Use of safety reel in lost line drill
7. Properly conduct bail out exit including bottle swapping while following a guideline
8. Properly conduct bail out exit including bottle swapping simulating zero visibility and using touch contact while following a guideline
9. Simulated situations/emergencies including:
10. Line entanglement
11. Broken or cut guideline
12. Primary light failure
13. Valve/regulator failure
14. Fin and mask failures
15. Communication
16. Light
17. Hand and touch
18. Candidates are required to present a minimum of 6 lectures,3 prepared and 3 impromptu, from the *TDI Diving in Overhead Environments* Diver materials

Candidate must be proficient with the following in-water skills during introductory cave dives. Candidates must proficiently demonstrate and conduct the student through a selection of the following:

1. Properly deploy a guideline
2. Properly use directional and non directional line markers
3. Properly follow a guideline
4. Properly follow a guideline simulating loss of visibility
5. Perform bailout exit practicing bottle swapping with teammates, following the guideline
6. Perform bailout exit practicing bottle swapping with teammates simulating zero visibility and using touch contact, following the guideline
7. Remove and replace mask while in contact with guideline
8. Demonstrate light / hand signals and touch contact
9. Conservation and awareness techniques
10. Referencing as back-up navigation
11. Demonstrate adequate anti-silting techniques
12. Simulate a primary light failure, and use back light to exit the cave
13. Demonstrate lost line drills using instrumentation lighting only
14. Demonstrate lost diver drills
15. Demonstrate to use of reels to perform jumps and gaps required in circuits and traverses to maintain a continuous guideline to open water
16. Exit the cave flying the rebreather in SCR mode
17. Exit the cave simulating solenoid failure (if applicable)
18. Demonstrate advanced navigation techniques including a minimum of:
    a. 4 jumps
    b. 2 circuits
19. Demonstrate rebreather unit specific skills in compliance with current level of rebreather certification as outlined in the TDI course curriculum

Note: All situation/emergency drills are to be conducted during the exit of all dives.

Note: A continuous guideline to open water must be maintained on all cave dives.

In addition to the above, the candidate must:

1. Complete the TDI Diving in Overhead Environments Instructor written examination with a minimum score of 80 percent with 100 percent remediation
2. Complete all land drills and cave diving requirements safely and efficiently
3. Demonstrate mature, sound judgment concerning dive planning and execution
4. Maintain an appropriate level of awareness and respect for the cave environment
5. Receive the recommendation for certification by the training director

Note: An irresponsible or cavalier attitude is sufficient grounds to deny certification.

30.11 Renewal Requirements

1. Have certified at least 4 TDI Rebreather Cavern Divers or TDI Rebreather Intro to Cave Divers and at least 2 TDI Rebreather Full Cave Divers
2. Taught a minimum of 3 complete courses
3. Logged a minimum of 15 non-training cave dives