

24. Mine Diver Level I

24.1 Introduction

This course is the first stage in the TDI Mine Diver development program and is an introduction to the basic principles of mine diving utilizing a single primary guide line. This introduction is not intended to train divers for all facets of mine diving. The objective of this course is the perfection of skills taught in the TDI Cavern Diving program, in addition to the adoption of additional techniques and procedures required for elementary mine dives. This course may be combined with TDI Mine Diver Level II at the discretion of the instructor.

This course uses the same principles and techniques as the TDI Intro to Cave course, including utilizing the same training materials and equipment. However, dual certification is not permitted and graduates wishing to dive in caves must complete the TDI Intro to Cave course.

24.2 Qualifications of Graduates

Upon successful completion of this course, graduates may engage in single guideline Mine diving activities without direct supervision, provided the graduates adhere to the following limits:

1. Penetration is limited to 1/3 of a single diving cylinder, or 1/6th if using double cylinders
2. 40 metres / 130 feet maximum depth
3. No decompression diving
4. Maintain a continuous guideline
5. Proper mine diving equipment is used
6. Upon successful completion of this course, graduates are qualified to enroll in:
 - a. TDI Mine Diver Level II course

24.3 Who May Teach

Any active TDI Mine Diving Instructor specifically authorized by the HQ Training Department. Minimum criteria to be considered for authorization are: TDI Full Cave Instructor with a verifiable minimum of 30 mine dives OR complete a Mine Diver Level 1 Instructor course with an active status TDI Mine Diver IT. Prerequisites for the Mine Diver Level 1 instructor course include certification as a Mine Diver Level 2, certification as a TDI Nitrox instructor or higher, proof of 150 logged mine dives, have taught a minimum of 4 TDI courses, and have assisted with at least one TDI Mine Diver Level 1 course.

24.4 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

Confined Water (swimming pool-like conditions)

1. N/A

Mine Dives

1. A maximum of 3 students per active TDI Instructor are allowed
2. The ratio should be reduced as required due to environmental or operational constraints

24.5 Student Prerequisites

1. Minimum age 18
2. Certified TDI Cavern Diver or equivalent OR Open Water Scuba Diver with 25 logged dives. If students are not cavern certified, 2 additional dives must be added to the course, with all skills from the Mine Diver Level 1 course to be performed during those two dives in the natural or artificial daylight zone of the mine prior to conducting any further dives beyond the light zone. Diver must demonstrate buoyancy control, trim and proper propulsion technique before progressing beyond the light zone.
3. Divers must have SDI Deep Diver certification (or equivalent) or provide proof of experience to dive deeper than 18 metres/60 feet in this course.

24.6 Course Structure and Duration

Water Execution

1. Minimum of 4 single guideline mine dives with a total bottom time of 100 minutes conducted at 2 different sites (different water entry points in the same mine system may be considered a different site for Mine Diver Level I training if they are at least 50 metres / 165 feet apart)
2. If the student is already certified as a TDI Intro to Cave or Full Cave Diver, a maximum of 2 dives may be credited towards Mine Diver Level I training at the discretion of the instructor
3. If combined with Mine Diver Level II, a total of 12 dives with a total minimum bottom time of 340 minutes must be conducted over a minimum of 6 days.

Course Structure

1. TDI allows instructors to structure courses according to the number of students participating and their skill level

Duration

1. The minimum number of classroom and briefing hours is 4
Course must be taught over 2 days

24.7 Administrative Requirements

The following are the administrative tasks:

1. Collect the course fees from all the students
2. Ensure that the students have the required equipment
3. Communicate the training schedule to the students
4. Have the students complete the:
 - a. *TDI Liability Release and Express Assumption of Risk Form*
 - b. *TDI Medical Statement Form*

Upon successful completion of the course the instructor must:

1. Issue the appropriate TDI certification by submitting the TDI Diver Registration Form to TDI Headquarters or registering the students online through member's area of the TDI website

24.8 Training Material

Required Material

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)*

Optional Material

1. *NACD Art of Safe Cave Diving*
2. *Basic Cave Diving – A Blueprint for Survival*
3. *CDA – Cavern / Sinkhole Manual*
4. *NSS-CDS Cave Diving Manual*
5. *The Darkness Beckons – Martyn Farr*
6. *Cavern Measureless to Man*

24.9 Required Equipment

The following equipment is required for each student:

1. Primary cylinder(s); volume appropriate for planned dive and student gas consumption
2. Dual-orifice (Y) or (H) closed valve or dual valve manifold
3. Two independent first and second stage regulators; one regulator equipped with a long hose at a recommended minimum length of 2 metres / 7 feet
4. Submersible pressure gauge
5. Buoyancy compensator device (BCD) with power inflator
6. Exposure suit adequate for diving environment
7. Mask and fins, NO snorkel
8. Line cutting device
9. Three battery powered lights; 1 primary and 2 back-ups, each with a with burn time suitable for the planned dive time
10. Safety reel with a minimum of 37 metres / 125 feet of guideline
11. One primary cave-diving reel with length appropriate for intended dive
12. Computer, watch or bottom timer and depth gauge
13. Slate or wet notes with a pencil
14. Submersible dive tables or backup dive computer
15. Three directional line arrows

Required equipment is the same as TDI Intro to Cave diver. Instructor must use equipment required for TDI Full Cave diving during all water exercises

24.10 Required Subject Areas

The following topics must be covered during this course:

1. Policy for Mine/Cave Diving
2. Gas Matching Procedures and Management to Include Dissimilar Volumes
3. Psychological Considerations
4. Equipment Considerations
 - a. Cylinder options
 - b. Regulator options
 - c. Buoyancy compensator device (BCD) / harness options
 - d. Reel options
 - e. Proper weighting
 - f. Equipment configurations

5. Communication
 - a. Hand signals
 - b. Light signals
 - c. Touch contact signals
6. Swimming Techniques
 - a. Body posture/ trim
 - b. Buoyancy control
 - c. Line following
 - d. Propulsion techniques
7. Physiology
 - a. Breathing techniques
 - b. Stress management
8. Mine Environment
 - a. Types of mines
 - b. Geology
 - i. Bottom
 - ii. Ceiling
 - c. Structure
 - d. Hazards
 - e. Local access requirements
 - f. Land owner relations
9. Conservation
10. Problem Solving
 - a. Emergency procedures
 - b. Equipment failure
 - c. Silting conditions
11. Accident Analysis
12. Review of Dive Tables and Decompression Theory
13. Mine /Cave Diving Etiquette

24.11 Required Skill Performance and Graduation Requirements

As much of the following information as possible must be determined/obtained and utilized in dive planning:

1. What material(s) were extracted from the mine and by what method(s)
2. Were toxic solutions or substances used or created during the extraction process and is there a risk of such substance(s) remaining or of any general pollution. If so, ascertain which location(s)
3. Obtain a detailed map of the mine from the mining company or whoever is responsible for the site

4. Are there any known or potentially collapsible tunnels?
5. All known access and egress points from the mine, their depths and possible emergency traverses to other exits
6. Type(s) of sediment in the mine
7. Type of ceiling supports; ie wooden or metal and how to detect signs of wear, type of debris left in the mine
8. All possible entanglement points
9. Location, size and depth of vertical extraction shafts
10. Points that could damage divers' delicate equipment such as lines, dry suits, etc
11. Line options
12. How to evaluate the stability of a passage
13. Existing collapse points
14. Special equipment requirements
15. Type of entry/exit

Land Drills

1. How to properly:
 - a. Deploy a guideline
 - b. follow a guideline
2. Use of safety reel in:
 - a. Lost diver procedures
 - b. Lost line drill

The student must perform the following S-drill and skills during all dives:

1. Demonstrate:
 - a. Adequate pre-dive planning
 - b. Equipment check and equipment matching
 - c. Bubble check
 - d. Specialized propulsion techniques in varying types of flow
 - e. Proper buoyancy control
 - f. Proper body posture
 - g. Proper stress analysis (detection and management)

In-water skills

1. Properly deploy a guideline
2. Properly use line markers
3. Properly follow a guideline with eyes open and closed, simulating loss of visibility
4. Air share with a buddy with eyes open, following the guideline
5. Air share with a buddy with lights off, eyes closed and use touch contact, following the guideline

6. Remove and replace mask while in contact with guideline
7. Demonstrate light / hand -signals and touch contact
8. Conservation and awareness techniques
9. Referencing as back-up navigation
10. Demonstrate adequate anti-silting techniques
11. Simulate a primary light failure, and use back light to exit the mine
12. Demonstrate lost line and lost diver drills
13. Identify and avoid potential hazard, entanglement and collapse points

In order to complete this course, students must:

1. Satisfactorily complete the TDI Intro Cave Diver Course written examination (*this requirement may be waived by the instructor if the student is already TDI Intro to Cave certified*)
2. Perform all land drills and mine dive 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 mine environment
5. Log all dives

24.12 Permission to Dive

Before conducting training in any man-made environment, permission must be obtained from whoever is responsible for the site; for example the mine owner/operator, government department, etc. Additionally, the relevant local emergency services should be informed of the activity prior to commencement.