Diver Propulsion Vehicle 1
Instructor Guidelines
Version 2.0

DPV 1 Instructor Guidelines

Contents

Training Considerations

GUE's Diver Propulsion Vehicle (DPV) Level 1 course is designed to introduce divers to the skills and knowledge required to safely use underwater propulsion vehicles in open water.

Other course outcomes include:

- Knowledge of the basic principles of DPV diving
- Dive planning and teamwork while using a DPV
- Environmental and conservation awareness while using a DPV
- DPV standard and emergency procedures, potential hazards of diving with a DPV
- DPV maintenance and troubleshooting

The course pre-requisites are to hold a GUE Recreational Diver Level 1 or GUE Fundamentals certification. This means that the level of students' skills and experience may vary widely from very limited (minimum of 75 non-training dives are required, and 25 beyond GUE certification) to very experienced, as the student may already be a technical or cave diver or even an instructor from another agency who has passed a GUE Fundamentals class.

The GUE DPV Level 1 class should be adapted based on participating students' experience and capacity in a way that allows each of them to fulfil the passing criteria for this class. Note that the passing criteria for trim and buoyancy are defined at the recreational level (5 ft/1.5 m buoyancy variation and 30 degrees off horizontal trim); however, if students have the capacity and experience, instructors are strongly encouraged to aim for a technical level of performance.

Keep in mind that after completing the DPV Level 1 class, students will use the scooter in various environments and up to their level of open water training. This may include recreational shallow open water dives as well as technical deep dives in open water (Tech 1, Tech 2, or rebreather ocean dives).

Be aware that introducing a DPV will increase the task loading of divers while decreasing their awareness and initial capacity. Emphasize the value of gradual dive competence development; that is, a natural progression that comes from building up experience with the new piece of gear, specific procedures, additional planning considerations, and safety aspects.

Course Sequencing

The Diver Propulsion Vehicle Level 1 course is normally conducted over three days.

It requires a minimum of five dives and at least twenty-four hours of instruction, encompassing classroom lectures, land drills, and in-water work.

It is highly recommended to add an experience dive (Dive #6) to allow for more in-water time and practical application of the newly acquired skills while under an instructor's supervision.

Academic components 1 – 3 (Chapter 1 to Chapter 3) must be conducted before Dive #1.

Land drills covering equipment preparation, preparation of a GUE-approved DPV (including verification of DPV weighting and trim), and pre-dive preparation and checks must be conducted before Dive #1.

Other Considerations

Equipment: DPV

A GUE-approved DPV is one that is tow-behind style with an adjustable speed and clutch mechanism. The DPV must include an attached cord (tow cord) at the back with a bolt snap to be clipped on the front crotch strap D-ring. It must be equipped with a leash (tow leash) attached to the front to be used for towing. The DPV must also be equipped with a front handle.

Before class begins, determine which models of DPVs the students will be using and familiarize yourself with the specifics of those units. If you are providing scooters for the training, provide students with a User Manual for that particular type in advance of the class.

Students should prepare by reading the User Manual of their unit, and so should you. Remember that the recommendations of the DPV's manufacturer should be followed at all times.

Before entering the water with a DPV, ensure that the unit is properly prepared with all required features, is properly weighted and trimmed, and the batteries are charged. Small adjustments are possible during training, but do not teach with an unbalanced DPV, as this may prevent a student from learning properly, create unnecessary workload, or pose a risk to students.

Equipment: Other

Be cautious about the possible risk of gear getting entangled in the DPV's propeller and make students aware that proper and tidy gear placement, streamlining, and awareness are paramount for safety while using a DPV.

Pay special attention to regulator placement, as the orientation of second stages may cause a free-flow due to increased water movement while traveling on a DPV. Promptly react to any free-flowing regulator situation. Be aware of the possibility of increased gas consumption or rapid gas loss.

Traveling at faster speeds close to objects poses a higher risk of entanglement, collision, and equipment damage, possibly leading to malfunction (e.g., valves, cords, hoses, drysuit).

Traveling with a scooter eliminates the possibility of using both hands at the same time to manipulate equipment, so be aware that students may find it more challenging to control buoyancy, equalize, and manipulate equipment while traveling.

Environment

GUE instructors must not conduct training dives and drills in areas that are environmentally or culturally sensitive or that could be damaged by the training.

Keep in mind that students may not have enough control at the beginning of the class and may damage environments that in other circumstances would not have been affected by their diving skills. Choose your training dive sites carefully and with respect of environment and other users of the dive sites.

Maintaining neutral buoyancy is critical in ensuring proper positioning and handling of a DPV in any environment.

Safety

Extreme care must be taken to ensure that students switch off the DPV and lock the trigger when it is not being used (any stowed position), due to the combined risk of entanglement and a runaway scooter.

Other safety considerations include (but are not limited to):

- Equalization problems
- Buoyancy problems (both divers and DPVs): excessive buoyancy, negative buoyancy
- Team separation (loss of visibility, runaway DPV, not matching speeds)
- Runaway DPV and injuries
- Task loading, reduced awareness, reduced capacity to solve problems
- Sudden gas loss
- Collisions with divers and/or objects
- Other users of the dive sites (collisions): emphasize that students must behave respectfully when using a DPV. They need to understand that other divers may not have the same awareness level and may be overtaken and scared by the sudden appearance of a DPV diver. Being cautious about other divers will help ensure that using DPVs at their dive site will also be allowed in the future.

Land Drill/Field Lecture Outlines

The following land drills and field lectures must be conducted during the GUE DPV 1 course.

1. GUE-Approved DPV Adjustments

- Tow cord attachment, including a discussion on different types.
  - Tow cord types:
    - Adjustable
    - Fixed
- Tow cord bolt snap attachment options:
    - Fixed
    - Sliding
    - Semi-fixed with cave line
- Front handle positioning and options
- Tow leash setup, positioning, and options

2. DPV Assembly and Pre-dive Checks

- Battery voltage check
- O-ring checks
- Functionality test
- Scooter balance and trim
- Tow cord positioning and adjustments

3. Underwater DPV Operations

- Scooter positions
  - Ready to go
  - Go
  - Temporary stow
  - Permanent stow
- Switching scooter on and off
- Team positioning
  - Single file
  - Wing-on-wing
  - Staggered
- Turns and maneuvering
- Right/left hand operation
- Primary light repositioning while traveling
- SPG check while traveling
- Valve check while traveling
- Light communication while traveling

4. DPV Emergencies and Problem Management

- S-drill review (including discussion on scooter positions)
- Towing a scooter
- Towing a diver with a non-functioning scooter
- Runaway DPV
  - Crash avoidance
  - Slowing a scooter down
  - Releasing the trigger (stuck/caught in a tow cord)
  - Turning a scooter off (switch/pitch control)
- Flooded scooter (unclip and drop) *Floatation devices to support students while on the surface (if needed)* Aquatic Session #7

Dive Outlines

Dive #1: Static Skills

The dive must be conducted in confined water conditions.

1. Descend as a controlled team (scooters are switched off and held by the front handle)
2. Practice and adjust trim, buoyancy, and balance
3. Check tow cord length and adjust
4. Demonstrate and practice placing scooter in different positions:
    - Ready to go: scooter is held by the front handle, light is on the left hand
    - Go: push scooter to the front, put right hand onto the trigger handle; check that tow cord, light cord, and long hose are clear of the propeller
    - Return to the "ready to go" position
    - Temporary stow: verify that the scooter is off, push scooter between thighs, level off, establish proper trim and buoyancy
    - Permanent stow: move the light to the temporary position, check that light cord is tucked away. Verify that the scooter is turned off, unclip the tow cord, and clip it onto the front handle. Use the tow leash to clip the scooter to the crotch strap front D-ring.
5. Conduct a valve drill with the scooter in the temporary stow position
6. Move scooter to the "ready to go" position
7. Ascend with at least one stop

Dive #2: Individual Dynamic Skills

The dive must be conducted in confined water conditions with clear visual references/boundaries for students to follow while traveling with a scooter. A line course or a clearly defined practice area (e.g., a platform) may be most practical.

1. Descend as a controlled team (scooters are switched off, held by the front handle)
2. Check and adjust tow cord length, establish neutral buoyancy
3. Demonstrate and practice start => move procedure:
    - Starting from the "ready to go" position, turn scooter on
    - Set the speed (using variable speed knob or a pitch knob)
    - Move scooter to "go" position and signal "OK"
    - Check that equipment is not at risk of being caught in the propeller and that the propeller is not directed towards the bottom, press trigger, and start moving while assuming a proper body position.
    - Count to 5 and stop; bring scooter to "ready to go" position.
4. Demonstrate and practice different turns/maneuvering techniques:
    - Rotation of the handle/shroud
    - Sharp turns (both right and left)
5. Demonstrate and practice light repositioning (left hand to right hand)
6. Demonstrate and practice right/left hand operation
7. Demonstrate and practice inflating/dumping the wing while moving
8. Demonstrate and practice inflating/dumping a drysuit while moving
9. Demonstrate and practice a flow check while moving
10. Demonstrate and practice an SPG check while moving
11. Demonstrate and practice an S-drill (starting with the team facing each other, scooter in the hand in "go" position). Move scooters to the temporary stow position after donation, as practiced in Dive #1
12. Ascend with at least one stop

Dive #3: Team Dynamic Skills

The dive must be conducted in confined water conditions with clear visual references/boundaries for students to follow while traveling with a scooter. A line course or a clearly defined practice area (e.g., a platform) may be most practical.

1. Demonstrate and practice traveling team formations and working as a team
    - Speed matching
    - Coordinated turns
    - Coordinated sharp turns
    - Moving in a wing-on-wing formation
    - Moving in a single file formation
    - Moving in a staggered formation
2. Practice SMB deployment (scooter is moved to permanent stowed position before the SMB is deployed)
3. Practice the S-Drill (scooter is moved to temporary stow position, as practiced in Dive #2)

Dive #4: Emergency Procedures

The dive must be conducted in confined water conditions with clear visual references/boundaries for students to follow while traveling with a scooter. A line course or a clearly defined practice area (e.g., a platform) may be most practical.

1. Demonstrate and practice collision avoidance (extra sharp turns using front handle)
2. Demonstrate and practice runaway scooter management, including:
    - Slowing the scooter down
    - Resolving a stuck trigger
    - Resolving an entangled tow cord
    - Stopping the scooter (using on/off switch or de-pitching the scooter, depending on the model)
3. Practice the flooded scooter procedure
4. Practice the S-Drill and SMB deployment
5. Ascend with at least two stops

Dive #5: Towing Techniques

The dive must be conducted in confined water conditions, with clear visual references/boundaries for students to follow while traveling with a scooter. A line course or a clearly defined practice area (e.g., a platform) may be most practical. A straight, measured line is needed for time/distance estimations.

1. Estimate distance traveled and time needed in various scenarios:
2. Use the scooter to travel along the straight line while measuring time.
    - Swim* the same distance while measuring time.
    - Swim* while towing a scooter and measuring time.
    - Demonstrate/practice/measure time: towing a scooter vs. driving a scooter
    - Demonstrate/practice/measure time: towing a diver with a stowed scooter
3. Practice the S-Drill and SMB deployment
4. Ascend with at least two stops

*In this context, “swim” means moving without using a scooter, with the diver’s preferred finning technique. The purpose is to make students aware of the significant distance coverage differences that occur when they use a DPV, and what the consequences will be if it breaks and they need to return without it.

Dive #6: Experience Dive (optional)

The experience dive is highly recommended. The limitations of the experience dive are the limitations of the students’ actual certification, but the dive cannot exceed the defined DPV 1 course limits:

- Student-to-instructor ratio cannot exceed 3:1 during any in-water training.
- Maximum depth of 100 ft/30 m or the limit of the student’s certification, whichever is shallower.

- No overhead diving.
- All dives must be within minimum decompression limits (MDLs), i.e., no required stops

Global Underwater Explorers
18487 High Springs Main Street
High Springs, FL 32643
USA

info@gue.com | www.gue.com