American Avalanche Association
Professional Avalanche Training Bridge Exam
Guidelines and Proficiencies

AMERICAN
AVALANCHE
ASSOCIATION

1.0 Introduction

This document contains the guidelines set by the American Avalanche Association (AAA) for the standard proficiencies and marking strategies for the Professional Avalanche Training 1 (Pro 1) Bridge exam. All guidelines are a minimum standard to provide commonality of training and evaluation in the professional avalanche education in America. Questions on the contents of this document can be addressed to the AAA's Professional Training Coordinator.

2.0 Pro 1 Bridge Structure and Requirements

Course Length: Minimum 12-16 hours

Course Providers: All Bridge exams must be taught by an AAA approved course provider. See AAA's *Structure and Oversight* document for information on becoming an approved provider.

Course Trainers: All courses will be staffed with at least one AAA-approved Lead Trainer and additional Course Trainers as needed to maintain appropriate student-to-instructor ratio. For pro trainer qualifications see AAA's *Structure and Oversight* document.

Student: Instructor Ratio: 6:1

Student Requirements for Enrollment:

1) Course applicants have completed the following AAA-recognized courses prior to enrollment:
    a) Level 1 Avalanche Training
    b) Level 2 Avalanche Training - (prior to 2017)

AND

2) At least one winter seasons (20 days or more) of relevant experience, demonstrated through one of the following:
    a) Prior avalanche work experience; **OR**
    b) A supervised unpaid work internship in the guiding/avalanche industry supported by a letter of reference **OR**
    c) Winter backcountry travel experience supported by documented trip planning and recorded field observations that contributed to avalanche hazard assessment and personal avalanche risk management. **OR**
    d) Letter of Recommendation from AAA professional member **OR**
    e) AAA Membership (Affiliate or Professional)

Learning Outcomes/Student Proficiencies: Demonstrate proficiency with Pro 1 Learning Outcomes, including Avalanche Rescue, Observation and Recording, Hazard and Risk Analysis, and General Knowledge.

Marking and Evaluation: 70% total marks are required to pass the course. In addition, several specific categories require a "categorical pass" of 70% to pass the course; these include station weather observations, snow profiles and snowpack tests, and the written exam. Tables 2 through 13 address student assessment principles, marking categories, criteria, and rubrics.

3.0 Pro 1 Bridge Learning Outcomes and Proficiencies

Table 1: Pro 1 Bridge Student Skills and Proficiencies

Skill	Proficiencies			
Observe, record and evaluate weather data	Conduct study plot weather observations using SWAG methods. Record using a time/subject tabular recording format.	Conduct and record field weather and surface snow observations using SWAG methods and guidelines.	Collect and record digital telemetry data and interpret the quality of the data set.	Identify key information from a week's data set of telemetry weather data.
Observe, record and evaluate snowpack data	Conduct a snow (test) profile using SWAG methods. Correctly identify important layer and interface characteristics.	Conduct compression test and other relevant small column test using SWAG methods and correctly identify fracture character and shear quality.	Conduct ECT, PST, and/or other relevant large column tests using SWAG methods and identify propensity for crack propagation in the weak layer.	Document snow profile and snowpack test information using SWAG recording standards.
Observe, record and evaluate avalanche occurrence data	Observe and record avalanche occurrence data using SWAG methods.			
Identify, analyze and document avalanche hazard factors	Identify and document the avalanche problem(s) using current weather, snowpack, and avalanche observations. Estimate how the weather forecast may affect the problem(s) during the forecast period. * The terms "avalanche problem" and "avalanche danger" used throughout this document are defined by the Conceptual Model of Avalanche Hazard (ADFAR2, 2016).			Identify the avalanche danger including *trend* and *confidence* using a Conceptual Model of Avalanche Hazard (ADFAR2).
Identify and characterize avalanche terrain	Identify avalanche terrain characteristics on maps, photos, and digital resources.	Identify avalanche paths in the field and describe the terrain characteristics that define the start zone, track, and run out.	Identify avalanche paths in the field and link the terrain and weather event characteristics to the expected avalanche problems and frequency of the specific site (refers to the generic terms seldom, occasional, frequent).	

Demonstrate a basic knowledge of avalanche formation and release	Demonstrates a basic understanding of weak layer characteristics and formation including: grain type, metamorphism, and persistence.	Demonstrates basic understanding of slab properties and how they influence avalanche release.	Relates weak layer characteristics and slab properties with the correct avalanche character. Pre-course/lectures
Demonstrate Avalanche rescue Response	Appropriately assess the safety of an avalanche incident scene.	Assess avalanche accident scenario and apply appropriate rescue methods based on available resources	Demonstrate competency as a solo rescuer by completing an avalanche rescue scenario to a determined standard.

4.0 Pro 1 Bridge Student Evaluation

4.1 Assessment Principles

Table 2: Student Assessment Principles for Professional Course Providers.

1. Marks are derived from assigned tasks. Students are informed of instructor expectations and the nature of course assignments prior to the course start date to facilitate student preparation.
2. Assigned tasks are evaluated after each student has received adequate instruction, coached application, and constructive feedback on that task.
3. The marking assignments are weighted to reflect their relative importance on the Pro 2 and are adjusted for the short course format
4. 70% total marks are required to pass the course.
5. A course provider will strive to avoid all conflicts of interest in evaluating students. Any concerns or complaints about unfair assessments will be directed to the AAA for review.
6. Course outcome: pass or fail. A certificate is awarded to successful students. Options for unsuccessful students at the discretion of the provider.

4.2 Marking Categories

The skills and proficiencies listed in Table 1 have been divided into four marking categories: one is pass/fail and the three remaining total 100 percent. 1) Avalanche Rescue Skills (pass/fail), 2) Observation and Recording (40%), 3) Hazard and Risk analysis (40%), and 4) Written Exam (20%).

Table 3: Marking Categories 1-4

Marks	Category 1: Avalanche Rescue Skills (Pass/Fail)	
Pass/Fail	**Solo Rescue** (one rescuer who is being evaluated) 50m x 50m area o 2 beacons buried in large backpacks o Burial depths of up to 1m Locate and bring to surface both beacons. Within 7 minutes.	o Successful completion of this portion of the evaluation is mandatory for successful completion of the course. o One retest of the solo rescue evaluation is allowed during the course. Timing of retest during the course is at the discretion of the course provider, but successful completion of the Avalanche Rescue Skills evaluation must be complete prior to being awarded a Pro 1 certification.

Marks	Category 2: Observation and Recording (40% of the course mark)	
5	**Documentation:** o Field book must be: 1) Neat, 2) Complete, 3) Relevant, 4) Consistent o -1 for errors.	
5	**Station Wx Observations** o Techniques with measurement and observations o Obtains accurate values o Uses correct notation or symbols o Understands when to reset o Understands significance of each measurement o Recognizes anomalous values See instructor guidelines for how errors are applied. Use SWAG example field book recording method for marks.	70% is required in Station Wx Observations to pass course. Option for retest. Only one retest per-student is allowed in this category.
20	**Snow Profile Observations** o Site selection, site description, weather - relevant to primary concern (2) o Air, Snow Temps (2) o Craftsmanship (2) o Layer/interface properties (10) o Uses correct notation or symbols (2) o Profile recording (2) o Test profile observing surface form, slab and weak layer properties. o Identify important layer and interface characteristics (from surface to greater than 15cm below layer of concern); use snow profile checklist/ Structural Indices to prioritize weak layers and interfaces.	70% is required in Snow Profile Observations and Snowpack Tests to pass course. Option for retest: ● After 14 days ● Complete 3 profiles prior to re-examination ● Approved evaluator ● Profile & tests are considered one exercise **Only one retest per student in this category.**
10	**Snowpack Tests** Small column tests o Includes fracture character and shear quality. Large column tests o Includes identifying propagation propensity.	

Marks	Category 3: Hazard & Risk Analysis (40% of course mark)	
20	**Hazard and Risk Analysis Forms-** *AM form(**10**)* *PM form(**10**)* o Forms are individually completed for evaluation. o AM forms include evaluation of confidence, trend, and identifies gaps in knowledge. o PM form includes field obs. summary, danger rating, and risk management debriefing questions.	No retest for any exercise within the Hazard and Risk Analysis category.
10	**Avalanche Occurrence Observations** o Includes path observations and description of event. o Include operational and backcountry events.	

10	**Avalanche Path Identification Exercise**
	o Identify avalanche terrain characteristics:
	  o On maps, photos, and digital resources;
	  o That define the start zone, track, and runout;
	  o Link the terrain and weather event characteristics to the expected avalanche problem(s) and frequency (seldom, occasional, frequent) at the specific site.	

Marks	Category 4: Written Exam (20% of course mark)	
20	**Written exam** o The exam should canvas a selection of topics from the course to provide evaluation of student comprehension, continued learning, and material delivery. o Test should be no more than 50 questions long and take no longer than 1.5 hours on average. o Test should use a variety of techniques (short answer, essay, matching, multiple choice, etc.) to assess student understanding o All tests will be closed book. o Accommodations should be made for students with testing, learning, and reading disabilities	70% on the written exam is required to pass course. Retest allowed after 14 days.

5.0 Instructor Marking Rubrics and Guidelines for Applying Marks

5.1 Avalanche Rescue Skills (Pass/Fail)

Table 4: Avalanche Rescue Skills Marking Rubric (Pass/Fail)

Mark	Description
Pass	Student locates, recovers, and brings to surface two beacons in less than seven minutes.
Fail	Student fails to locate, recover, and bring to surface two beacons in less than seven minutes.

5.2 Observation and Recording (40% of course mark)

Table 5: Documentation Marking Rubric - Field Books (5 Marks)

	Description
Exceeds Standard 4-5 (>80%)	Student's documentation is neat and complete. All fields are appropriately filled in including nil, null, and N/O values. Documents are easy to interpret and require little follow-up questions to the student.
At Standard 3.5 (70%)	Student's documentation is generally neat. Student may be missing an occasional piece of data and/or inappropriately used nil, null, and N/O values. Documents require several questions to the student to provide interpretation. Documents are useable by a supervisor
Below Standard <3.5 (<70%)	Student's documentation is generally messy, incomplete, and requires multiple questions to the student for interpretation. The documents are generally unusable by a supervisor. Data is missing and/or unreadable.

Manual Weather Station Observations

a. Students conduct and record the observations using SWAG guidelines in their notebooks using a subject/date tabular format.
b. The course study plot site should be in a realistic location that provides data relevant to the daily hazard and risk analysis and discussion. The site should be set up prior to the course to promote undisturbed snow.
c. The manual weather plot should include instrumentation to conduct all observations on the Standard Manual Weather Observation Recording Form with exception of Snow Water Equivalency.
d. Measurements may be made in metric units, imperial units, or a blend of each, based upon the course setting and operational objectives.
e. Additional automated weather station data is observed and recorded to supplement manual weather observations.

Table 6: Weather Station Observations Marking Rubric (5 Marks)

Mark	Description			
Exceeds Standard 4-5 (>80%)	Conducts measurements and observations using SWAG methods. Requires little or no coaching with techniques.	Obtains accurate values. Understands when to reset.	Understands significance of each measurement. Recognizes anomalous values	Notebook is neat, complete, and easy to understand. Uses correct notation or symbol.
At Standard 3.5 (70%)	Makes three or fewer minor errors but completes all observations.	Forgets to reset but performs the task accurately once reminded.	Misses anomalous values.	Notebook is messy, eraser smears, numbers or symbols hard to read.
Below Standard <3.5 (<70%)	Makes four or more minor errors or more than one major error. Major errors include: forgets to measure new snow or water equivalent, misses a persistent grain type on snow surface, or incorrectly calculates settlement.	Values are incorrect and of no use to the forecaster; or requires excessive coaching to perform observation to SWAG standard.	Requires repeated prompting to understand significance of a measurement. Cannot accurately perform a measurement after prompting.	Notebook is unreadable.

Sample Manual Weather Observation Recording Form

STATION WEATHER OBSERVATIONS: *General Description of Region and Operation*						
LOCATION: (i.e. name, elevation, treeline reference, etc.)	**Example: Mid Plot 8743'**					
Date	**20150201**	20150201	20150202	20150202	20150203	20150203
Time	**1130**					
Sky	**OVC**					
Precip Type/ Rate	**S-1**					
Temp Max °C /F	**-1.0**					
Temp Min °C /F	**-5.5**					
Temp Pres °C /F	**-5.0**					
Surf T °C /F	**-5.0**					
T 20 °C /F	**-3.5**					
H2D cm /in	**5**					
HSTW mm /in	**4**					
HST cm /in	**18**					
Additional Boards may be added to meet venues format including SWE measurements						
HS cm /in	**103**					
Foot Pen cm	**35**					
Surface Form, Size mm	**SH, 3.0**					
Wind Speed/Dir.	**L/ N**					
Blowing Snow	**U**					
Comments *	**Flurries started 0400hrs est.**					

** Comments may include information about snowfall intensity, durations, surface crust thickness, etc.*

Table 7: Snow Profile and Snowpack Test Observations Marking Criteria (30 Marks)

Mark	Topic	Description
2	**Site Selection and Description**	o Instructors choose the general exam location, but students are required to select their individual site. Sites should be probed prior to digging to ensure the site provides relevant information. o Examiners will provide 15 min. warnings to ensure the students are on time. o Students are allowed to dig in teams of two to reduce the strenuous nature of the initial excavation. o Snow profile exams require a student to conduct a test profile targeting the avalanche problem that has been discussed during the course. o All measurements and techniques should be conducted to SWAG standards. o Students may work with a partner to cut columns for large column test. o Instructors need to see each student conduct at least one test. Extra time may be allotted if a delay occurs while the instructors are observing another student's snowpack test.
2	**Air and Snow Temps**	
2	**Craftsmanship**	
10	**Layer/Interface Properties (Depth, Hardness, Grain Type/Size, Moisture)**	
2	**Uses Correct Notation**	
2	**Profile Recording**	

Mark	Topic	Description
5	**Small Column Test: Compression Test**	o Conducts small column tests to SWAG standards. o Uses CT to confirm layer ID in profile. o Correctly identifies fracture character/shear quality.
5	**Large Column Test: ECT and PST**	o Conducts ECT and PST using SWAG methods. o Identifies propensity for crack propagation and correctly relates findings to layers ID'd in profile.

Table 8: Timing Allocation for Snow Profile and Snowpack Tests

Observation Excavate from surface 1 meter or 15cm below layer of concern whichever is deeper (within reason). Time starts once the profile is roughed in to appropriate depth.	**Time**
Site selection, site description, notebook page headers	10
Temperature profile (Tair, Tsurf, T10 down to T40 as a minimum)	10
Layer ID: Slab characteristics; Weak layer/Interface characteristics	20
CT	20
ECT	
Total Time Estimate (not including excavation)	1 hr.

Table 9: Snow Profile (20 Marks) and Snowpack Tests (10 Marks) Marking Rubric

Marks	Description					
Profile (20)	Site Selection and Description **(2)**	Air and Snow Temps **(2)**	Craftsmanship **(2)**	Layer/Interface Properties (Depth, Hardness, Grain Type/Size, Moisture) **(10)**	Uses Correct Notation **(2)**	Profile Recording **(2)**
Exceeds Standard 16-20 (>80%)	Probes prior to digging. Site description informative. Clearly understands objective and digs to at least 15cm below layer of concern. Profile walls are clean and straight, careful not to disturb weak layer. Correctly identifies structural properties of slab, key layers/interfaces. Student can accurately describe and track layers by the date buried (i.e. the Jan. 13th HST, the Feb. 20th V, the MLK MF cr).					
At Standard 14-15 (70%)	Uses excessive time but information is good quality. No more than three minor errors. Example: incomplete site description, didn't probe enough prior to digging, profile too small, rough profile walls, improper shading of thermometers, does not record surface form. Carelessness with structural indices results in missed grain size or hardness difference and misses one of several less important weak layers. Sloppy craftsmanship-- but finds most important snowpack characteristics.					
Below Standard <14 (<70%)	Four or more minor errors (see above). Failure to correctly identify obvious primary weak layer results in failure of this category.					

Marks	Description	
Snowpack Tests (10)	**Small Column Test:** Compression Test **(5)**	**Large Column Test:** ECT **(5)**
Exceeds Standard 8-10 (>80%)	Conducts small column tests to SWAG standards. Uses CT to confirm layer ID in profile. Correctly identifies fracture character/shear quality.	Conducts ECT using SWAG methods. Identifies propensity for crack propagation and correctly relates findings to layers identified in profile.
At Standard 7 (70%)	Did not correctly ID fracture character. Could not relate the layer ID in column test to profile wall.	Poor craftsmanship but acquires key information
Below Standard <7 (<70%)	Missed or did not observe sudden fractures. Poor technique (tapering column), inconsistent taps.	Poor craftsmanship or observation results in missed information.

5.3 Hazard and Risk Analysis Forms Marking Criteria (40% of course mark)

Bridge Course emphasis: Student's ability to summarize and communicate daily observations, contribute to the small group risk management decisions, and manage their own risk. At the Pro 1 standard, emphasis is given to the student's ability to summarize and document observations rather than provide a forecast. This category must be passed with a grade of 70% or higher.

Table 10: AM Form (10 Marks)

Marks	Description
1	Accurately observe and record today's critical weather factors.
1	Accurately identify today's critical hazard factors including describing the avalanche problem(s) in the order of concern.
2	Accurately describe any uncertainty (gaps in knowledge) and propose tests and observations that fill that gap.
2	Rate today's hazard, hazard trend, and confidence in your forecast.
4	Accurately describe specific terrain features or runs the group should avoid given today's avalanche problem.

Table 11: PM Form (10 Marks)

Marks	Description
4	Accurately summarize field weather, snowpack, and avalanche occurrence observations, using standard and non-standard tests, and provide evidence that supports your conclusion about the avalanche problem in the area observed.
2	Accurately summarize the hazard in the area observed, describe the avalanche problem(s) in the order of significance with hazard rating and trend.
4	Summarize how successfully your group managed the risk, where mistakes were made, and what could be improved for tomorrow.

5.4 Written Exam Marking Criteria (20% of course mark)

Table 12: Written Exam (20 Marks)

Marks	Category 3: Knowledge (20)	
20	Written exam o The exam should canvas a selection of topics from the course to provide evaluation of student comprehension, continued learning, and material delivery. o Test should be no more than 50 questions long and take no longer than 1.5 hours on average. o Test should use a variety of techniques (short answer, essay, matching, multiple choice, etc.) to assess student understanding o All tests will be closed book. o Accommodations should be made for students with testing, learning, and reading disabilities	70% in the written exam is required to pass course.