



ASPHALT PAVEMENT
ASSOCIATION OF OREGON

APAO Training Program Guide

Taking Courses and Passing Certification Exams

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Every technician has the ability to pass a certification exam. But, passing requires commitment. This guide describes the commitment needed to pass the certification process.

Failing exams is not good for employers or technicians. Training takes time and costs money, and no one wants to waste their time or their employer's money. Although some technicians may still fail, taking this guide seriously and following its recommendations will increase the chance of passing.

Supervisors should evaluate whether technicians are ready for training courses *before* courses start. Do not register technicians for a course without assessing whether the technician is ready and can meet the needed commitment during the course.

Contact us if you have questions or concerns about the expectations. Never assume that a course or an exam will be the same as in prior years or that your experience or others' experiences will be the same. Courses and procedures change, and everyone learns differently. Many technicians also have not been in a classroom and dealt with exam stress for years.

Assuming a course will be easy is a mistake.

If you have any concerns related to individual learning types, the classroom setting, or exam taking, it is better to address them *before* registering for a course. In most cases, we will have suggestions that should help.

Pre-Course Assessment & Preparation

Before registering for a course, a supervisor should explain the purpose of the training and certification, and assess whether the technician is ready for the training and exam. Prior work in an asphalt plant laboratory and with the associated documents and reports will provide context for courses and the subjects.

Courses generally instruct technicians on the principles, sampling, testing, calculations, and reporting needed to competently perform the tasks associated with a certification. **Courses do not focus solely on exam preparation and instructors rarely walk students through how to solve particular exam problems.** Exam problems are rarely the same as problems covered in courses, and technicians must understand the principles taught well enough to apply them in different contexts. Although courses are extremely helpful in preparing technicians for exams, courses primarily train technicians to perform the functions required under the certification categories, not pass an exam.

All courses require the ability to read and understand technical writing and perform math. Technicians should objectively consider their reading and math skills. Anyone who is unfamiliar with industry jargon or does not regularly read technical writing will struggle. Common areas of confusion include units and acronyms used in the specifications and test methods.

If you or your technician want or need help in preparing for the terminology and/or reading, please contact us and we will make suggestions based on your or your technician's concerns.

Performing the math requires more than inputting numbers into a calculator. Technicians must be able to perform math by hand and by calculator. In addition to being able to add, subtract, multiply, and divide, technicians should understand the order of operations and be able to work with fractions and different units. The math can be challenging for anyone who does not use the concepts and skills on a regular basis. We recommend reviewing the materials found through the following link:

https://www.oregon.gov/ODOT/Construction/Doc_GenConstInspectorTrainingManual/basic_hwy_math.pdf.

Before the first day of training, technicians should also thoroughly review the applicable specification sections for the certification and the Manual of Field Test Procedures (“MFTP”) sections. Technicians should also use the forms associated with a course multiple times and understand the purpose and at least generally understand the information required to complete the forms. For some courses, technicians should have laboratory experience and know the best practices for sampling, handling, and testing aggregate and asphalt materials.

Courses are not designed to introduce technicians to the specifications, the MFTP, or forms – courses are designed to train technicians on the underlying principles and how to competently perform technician duties. It is extremely difficult – if not impossible – to learn the principles and duties if a technician has never read the applicable specifications, procedures and forms prior to a course.

Attendance

We expect technicians to attend every day of a course for the entire day. Although emergencies and important commitments sometimes must take precedence, employers and technicians should review the course schedule and compare it to their work and family schedules before registering for a course. If a known work or family commitment will require a technician to be absent on a day of instruction, we recommend not registering for that course and finding a time when the course is offered and the technician can make it to every instruction day.

If an absence is unavoidable, technicians should tell the instructor(s) as soon as possible. The instructor will make suggestions with respect to self-study and/or rescheduling. With enough notice, we can often structure the instruction such that the material will be sufficiently covered. However, technicians who are absent, will have extra work. For many technicians, an entire day of instruction cannot be condensed into a few hours of self-study.

Participation

During a course technicians must pay attention, engage with the instructor and other technicians, contribute when working in groups, complete homework, and have a positive attitude. Each instruction day is long (e.g., 8:00 AM until 4:30 PM), and instructors will cover

complicated concepts. To learn, technicians must be well-rested and awake. Instructors will ask questions and ask that technicians confirm whether they understand concepts. Technicians should answer questions and be willing to confirm whether or not they understand.

Technicians will miss things during a course. It is a mistake to assume you can catch up later. The course materials and subjects build on what was previously covered and any gap in understanding will make it very difficult to understand subsequent materials and subjects. Technicians should tell the instructor as soon as possible after missing something. If technicians do not want to stop a course, they should ask the instructor during a break or after class.

Every course requires technicians to review materials and solve problems after class (i.e., do their homework). Courses are not over for the day the minute instruction stops, and technicians are expected to do the assigned review and solve homework problems on their own time. Technicians should generally expect 3 to 5 hours of homework over the week for each course. Technicians with little experience should expect more.

If a work or family commitment will prevent a technician from having time for homework, we recommend not registering for the course and finding a time when the course is offered and the technician will have enough time for homework.

Exam Preparation

Passing exams requires understanding the principles and concepts, performing tests and reporting results, solving written problems, and completing testing in an asphalt laboratory. Although the after class study time will vary based on the course and technician, most technicians should expect studying instruction material and sample problems in addition to homework. If asked, instructors will provide specific recommendations based on the exam, technician, and situation.

Common signs a technician will fail an exam:

- Not preparing for a course before the course starts.
- Being unfamiliar with the applicable specifications, MFTP methods, and/or documents.
- Not doing homework.
- Doing or attempting to do homework in class.
- Arriving late and/or leaving early.
- Spending instruction time on or looking at a phone or tablet.
- Having work and/or family commitments during the course that are distracting or that prevent enough studying.
- Having a bad attitude (e.g., not engaging with the instructor or other students, not contributing in work groups, and generally not showing effort).

The following sections provide additional information for specific courses.

Training Expectations for CEBT Course

ODOT specifications require the maximum density of soils, soil/aggregate mixtures, and base aggregates be performed by CEBT-certified technicians. Certified technicians must also establish construction density targets for subgrade and bases. Before starting the CEBT course, technicians should:

- Be familiar with the ODOT forms used to report CEBT results: form numbers 3468 and 3468B.
- Have performed and thoroughly reviewed the test procedures for: specific gravity of coarse aggregate (test method T85), maximum density/optimum moisture of soils and rock (test methods T99*180 and TM223), and moisture content of soil and rock (test methods T255/265).
- Understand and have the ability to do the math required to complete test methods and report results. The math includes: percentages; multiplication and division (with whole numbers and fractions); knowing the order of operations for parentheses, multiplication and division, and addition and subtraction. Here is an example equation showing the general level of math skill required for the course.

$$\frac{(1532.6 - 1401.4)}{1401.4} \times 100 = 9.4\%$$

- Understand the terminology and acronyms used in the test procedures referenced above (see MFTP introduction section and Oregon Standard Specifications Section 00110.10).

Training Expectations for CDT Course

ODOT specifications require density testing for soils, aggregates, and ACP be performed by CDT-certified technicians. Before starting the CDT course, technicians should:

- Provide a Radiation Safety Certificate to ODOT. Technicians can obtain Radiation Safety Certificates from nuclear gauge manufacturers. The information and testing needed for certificates are generally available on the manufacturers' websites (Troxler, www.troxlerlabs.com; InstroTek, www.instrotek.com; Humboldt, www.humboldtscientific.com). Certificates may be brought to class on the first day.
- Be familiar with the ODOT forms used in reporting CDT test results: form numbers 1793S, 1793B, 1793A, 2327, and 2084.
- Have performed and thoroughly reviewed the test procedures for: moisture-density curves (test methods T99/180), moisture content of soil and rock (test methods T217 & T255/265), density testing with the nuclear gauge (test methods T310 & T355), and core correlations (test method TM327).

- Understand and have the ability to do the math required to complete test methods and report results. The math includes: percentages; multiplication and division (with whole numbers and fractions); knowing the order of operations for parentheses, multiplication and division, and addition and subtraction. Here is an example equation showing the general level of math skill required for the course.

$$\frac{[(17.9 \times 68) + (2.0 \times 32)]}{100} = 12.8\%$$

- Understand the process for delivering and placing asphalt pavement, including required compaction temperatures, how gradation and asphalt binder content generally affect mix properties, and the function of the paver, rollers, and common equipment used to place asphalt pavement at a project site.
- Understand the terminology and acronyms used in the test procedures referenced above (see MFTP introduction section and Oregon Standard Specifications Section 00110.10).

Training Expectations for CAgT Course

ODOT specifications require a technician to have a CAgT certification to conduct quality control testing during the production of aggregate materials for ACP, EAC, PCC, base and shoulder aggregate, chip seals, oil mats, and other products. Certified technicians will perform a variety of tests on soils and aggregates including sieve analysis, fracture, and sand equivalency, and will perform other duties required by the applicable specifications. Before starting the CAgT course, technicians should:

- Be familiar with the ODOT form used in reporting common CAgT test results: form number 1792. The form is included in the MFTP Forms section.
- Have performed and thoroughly reviewed the test procedures for: sieve analysis (test methods T27/11), moisture content (test method T255), fracture (test method T335), elongation (test method TM229), and sand equivalent (test method T176). All test procedures are included in the MFTP.
- Understand and have the ability to do the math required to complete test methods and report results. Examples of the math are: The math includes: percentages; multiplication and division (with whole numbers and fractions); knowing the order of operations for parentheses, multiplication and division, and addition and subtraction. Here is an example equation showing the general level of math skill required for the course.

$$\frac{(97.6/2 + 632.6)}{(632.6 + 97.6 + 652.6)} \times 100 = 49.3\%$$

- Understand aggregate production operations such as how the aggregate may change based on pit location, how production rates may influence aggregate properties, and the general sampling procedures.
- Understand the terminology and acronyms used in the test procedures referenced above (see MFTP introduction section and Oregon Standard Specifications Section 00110.10).

Training Expectations for CAT-I Course

ODOT specifications require a technician with a CAT-I certification be present at asphalt plants during asphalt mix production. The CAT-I course is not for inexperienced technicians. Technicians should be familiar with asphalt mix sampling and quality control testing. Certified technicians will perform sampling and testing for ACP and EAC mixtures including testing for asphalt binder content, maximum specific gravity, gradation, and voids. Before starting the CAT-I course, technicians should:

- Be familiar with the ODOT forms used in reporting common CAT I test results: form numbers 2277, 2050GVS, 2050, and 2401. The forms are included in the MFTP Forms section.
- Have performed and thoroughly reviewed the test procedures for: aggregate gradation (test method T30), Rice test (test method T209), bulking of compacted mix (test method T166), volumetric measurements and calculations (test method TM13), and meter method (test method TM321).
- Understand and have the ability to do the math required to complete test methods and report results. The math includes: percentages; multiplication and division (with whole numbers and fractions); knowing the order of operations for parentheses, multiplication and division, and addition and subtraction. Here is an example equation showing the general level of math skill required for the course.

$$\frac{1750.9}{1 + \left(\frac{0.20}{100}\right)} = 1747.4$$

- Understand asphalt plant components and asphalt mix production, including knowing how cold feed bins are used to feed the proper gradation to the mixing chamber, aggregate is dried, recycled materials are incorporated into the mix, asphalt binder is added during the mixing process, and asphalt materials are loaded into silos.
- Understand the terminology and acronyms used in the test procedures referenced above (see MFTP introduction section and Oregon Standard Specifications Section 00110.10).