Indiana CTE Next Level Programs of Study

Civil Construction Fundamentals (2025)

Heavy Highway Construction 7121.D1

1. **Investigate careers, equipment, and processes used in the construction of highways and bridges.** 7121.D1.1
2. **Identify the types of heavy equipment, utility equipment, and cranes used in the construction of bridges and highways.** 7121.D1.2
3. **Examine the safety hazards and precautions associated with construction of highways and bridges with emphasis on the importance of following safety procedures to prevent accidents and injuries associated with working in hazardous places/conditions.** 7121.D1.3
4. **Analyze the signs, signals, and barricades found on various job sites including highway workzone safety requirements.** 7121.D1.4
5. **Describe soil classification systems and explain how shrink and swell factors affect equipment selection; also discuss how soil conditions affect equipment performance and explain techniques for working with various types of soils.** 7121.D1.5
6. **Examine the methods used to set and interpret grade stakes.** 7121.D1.6
7. **List methods for controlling surface water and ground water on a job site, as well as the layout of foundations and laying of pipe.** 7121.D1.7
8. **Apply basic math skills required for site excavation work including methods and practice in calculating the areas and volumes of various geometric shapes, as well as formulas and methods used to calculate cut and fill requirements of a job.** 7121.D1.8
9. **Explain how to read site plans to calculate cut and fill requirements; interpret both roadway and construction site drawings used for excavation and grading work.** 7121.D1.9
10. **Attain readiness to take the first half of the NCCER Heavy Highway Construction Level 1 certification exams.** 7121.D1.10

Skip to main content

Concrete Finishing 7121.D2

1. Describe the methods and procedures used in concrete finishing. Identify terms of the trade and tools and equipment used to place, finish, and cure concrete. Explain methods and techniques for constructing concrete structures. 7121.D2.1
2. Explain safety requirements for concrete construction and finishing. Investigate information on OSHA requirements regarding hazard communication, fall protection, and use of personal protective equipment. Examine topics such as general work site safety, use of chemicals, and safe use of hand and power tools. 7121.D2.2
3. Analyze the properties of concrete and the components that make up the concrete mixture. Describe chemical and physical properties of cement, aggregate, and admixtures. Explain basic tests used to determine properties such as slump and ultimate strength. 7121.D2.3
4. Describe tools and equipment used in the production, placing, and curing of concrete. Explain safe operation and maintenance requirements. Demonstrate proper use of each hand tool and larger pieces of power equipment. 7121.D2.4
5. Investigate the methods and procedures used in preparing for placing concrete. Assess background information about site layout, forms requirements, and subgrade preparation. Describe requirements for various types of joints and reinforcement. Discuss the ordering of concrete from a mixing or batch plant. 7121.D2.5
6. Examine requirements and methods for properly placing concrete. Describe how to convey and place fresh concrete using various types of equipment, such as wheelbarrows, pumps and conveyors. Demonstrate techniques for spreading, consolidating, and striking off concrete. 7121.D2.6
7. Describe basic finishing techniques for slabs and other horizontal structures. Explain proper use of floats, trowels, edgers, and groovers and demonstrate their uses. Discuss requirements for cutting joints using different types of saws. 7121.D2.7
8. Compare the methods and procedures used in curing and protecting concrete. Discuss the types of curing commonly performed for both horizontal and vertical placement. Describe techniques for protecting concrete during hot and cold weather. 7121.D2.8
9. Describe basic problems for the processes of placing, finishing, and curing. Define symptoms of each type of problem and discuss their causes. Examine ways to reduce or eliminate these problems. 7121.D2.9
10. Attain readiness to take the NCCER Concrete Finishing Level I certification exams. 7121.D2.10