PREREQUISITES: Introduction to Public Works
GRADING METHOD: Instructor Option: Grade or Pass/No Pass.

COURSE DESCRIPTION

An advanced course in public works inspection covering Portland cement concrete culvert and bridge construction beginning with the field work of site preparation, structural excavation, concrete footings, "falsework" structures, structural and reinforcing steel, and concrete placement. Prime considerations will be given to inspection reporting, records, and new advances in technology.

COURSE CONTENT

I. Introduction

Objectives of the course

History and design of highways

Structure excavation

D. Structure backfill

II. Sub-Grade Preparation

Drainage channels and conduits

Drainage sewers and storm drains

Dewatering and well-point pumping

Cofferdams

III. Foundation Piling

Temporary wood and sheet steel piling

Creosote wood piling

Concrete piles

Steel-cased, "cast-in-place" concrete piles

IV. Portland Cement Concrete Footing

Design and specifications

Mixing and hauling
Placement and vibration

Tremie concrete

Testing and inspecting

V. Structural Forms

Wood and plywood

Sectional steel panels

Metal pans

Whalers and bracing

VI. Reinforcing Steel

Manufacturing and testing

Placement and securing

Welds and lapping

Cleaning and inspecting

VII. Structure "False-Work"

Contractor's detailed plans

Staging, walkways and ladders

Inspection walkways, special design

Footings and bearings

Maximum allowable "unit stresses"

Bolts, spikes and girts

VIII. Structural Concrete

Specification, mixing and hauling

Placement; conveying or pumping

Ordinary, Class 1 and Class 2 surface finishing

Membrane, burlap and water curing

IX. Structural Steel

Fabrication and testing

Certification of materials

Bearing and anchorage requirements

Shop and field assembly

E. Pins, rollers and bolted connections

X. Gunite and Shotcrete

Air-placed concrete equipment

Surface preparation, ground wires and inspection

Materials, proportioning and mixing

Placement, joints and curing

XI. Inspection and Safety Requirements

Inspection duties, records and reports

OSHA safety standards

Conduit and structure inspection methods

STUDENT LEARNING OUTCOMES

Upon completion of this course, students will be able to do the following:

1. Other

A. OUTCOME: Discipline/Subject Area Specific Content Material

OUTCOME: 1. identify and describe the skills, methods, and materials necessary for construction f concrete structures, through oral presentation and examination, as is necessary for public works inspectors

OUTCOME: 2. explain the proper methods for handling, placing, and finishing concrete, through oral presentation and written examination, as is fundamental to a quality concrete structure

OUTCOME: 3. cite the requirements of forming and falsework, through oral presentation and examination, according to industry standards

E. OUTCOME: Creative, Critical, and Analytical Thinking

OUTCOME: 1. demonstrate knowledge of basic elements of public works and analyze the fundamental properties and uses of Portland cement concrete, through written assignments and examinations, as required in the industry

OUTCOME: 2. analyze the reasons and methods of material testing as required to document testing for quality assurance in public works, through oral presentation and examination

H. OUTCOME: Computation

OUTCOME: 1. calculate quantities for payment of services supported by forms and records used in public works construction, through written assignments and examinations

OBJECTIVES

1. Identify needed skills in the construction and inspection of concrete footings, piers, culverts and bridge structures

Apply principles of bridge and box-culver construction and inspection

Pass a comprehensive examination concerning bridge and culvert construction and inspection

Explain the use of Portland cement concrete in structures

Correctly complete the forms and records currently used in public works construction

Assess areas of concrete structure "forming"

Identify the safety and inspection requirements of "false-work" structures

METHODS OF EVALUATION/ASSESSMENT

Typical classroom assessment techniques

Required assignments