

Road Construction Safety Management Career Pathway Documentation

Career Pathway: Road Construction Safety Management

**Master's Degree
Construction Management
or Civil
Engineering**

*With coursework or re-
search focused on systems
safety*

**Bachelor's Degree
Civil or Construction Engi-
neering**

*With coursework, re-
search, or other specialized
experience and/or training
on safety management*

**On-the-job training & ex-
perience, Apprenticeship,
or Technical College
Coursework
(Certificate or Associate's
Degree)**

*With training/coursework
in heavy equipment opera-
tions, construction or civil
engineering technology*

PROGRAM OF STUDY

+5 years specialized work experience and training focused on systems safety performance, safety leadership, and safety management principles.

+4-10 years work experience in roadway construction with on-the-job experience and specialized training in safety management practices.

+6-24 months work experience with specialized training in safety practices.

POS On-Ramp

Career Off-Ramp

**Road Construction
Project Manager**

- **Construction Manager
(SOC 11-9021)**

Salary: \$91,370

**Road Construction
Supervisor /Project Engineer**

- **First-line Construction Supervi-
sor
(SOC 47-1011)**
- **Civil Engineer
(SOC 17-2051)**

Salary: \$64,070-\$84,770

Road Construction Worker

- **Construction Equipment Op-
erator
(SOC 47-2073)**
- **Construction Laborer
(SOC 47-2061)**

Salary: \$34,530-\$47,040

CAREER LADDER

Alternative Job Titles

Project Engineer, Construction/Project Manager, Heavy Highway/Civil Construction Superintendent, Project Foreman

Job Description

A Construction Manager for heavy civil and highway/roadway projects is responsible for the overall completion and management of construction projects. Responsibilities include oversight of project quality control, financial controls, production efficiency, site safety, and project management systems and reporting. The position requires knowledge of construction and project management practices, equipment, standards and policies, and job site reporting. Construction Managers provide leadership on safety promotion on the project site. Safety-related competencies include knowledge of systemic safety principles to assess risk, develop safety plans, and promote, implement, and evaluate project safety. Duties include:

- Identify hazards and control measures for each phase of a project.
- Develop safety plans based on risk assessment, incorporating knowledge of safety regulations and compliance measures.
- Utilize effective traffic control techniques to ensure safety of project site workers and those passing through a work zone.
- Implement effective safety measures on site and use safety management techniques to conduct incident investigations, identify deficiencies, and implement effective countermeasures.
- Understand systemic road safety principles and crash reduction factors; ensure road design and construction practices integrate road safety best practices.

Knowledge Requirements

- Construction & Traffic Control Practices
- Health, Safety & Environmental Policies and Compliance
- Job Hazard & Risk Analysis
- Incident Investigation
- Safety Design & Countermeasures
- Project Management Practices
- Construction Equipment
- Estimating/Budgeting/Cost Control
- Quality Assurance and Control

Required Skills & Abilities

- Project Management/Supervision
- Written and Oral Communication
- Organizational Skills
- Time and Task Management Skills
- Teamwork
- Problem Solving
- Interpersonal & Conflict Resolution
- Safety Culture Leadership

Technical Skills Requirements

- Scheduling Software
- Cost Estimating & Tracking Software
- Microsoft Office Applications

Education & Work Experience

- A combination of education and work experience is generally accepted.
- A Bachelor's or Master's degree may be required for some senior positions.
- Additional certifications or licenses may be required by employers (e.g. CDL, OSHA, Safety Trained Supervisor, Work Zone Safety Certifications, Safety Certified Transportation Project Professional).

Certifications

Construction Managers can apply for a variety of professional certifications, which attest to the attainment of a specified body of knowledge and capability. In the field of transportation safety, the American Road and Transportation Builders Association (ARTBA) Safety Certification for Transportation Project Professionals provides an industry-recognized credential to those demonstrating specific transportation project safety competencies.

Master's Degree in Civil or Construction Engineering or Construction Management

Year 5-6

Year 6: Students complete electives and required research thesis or professional paper requirements for the degree.

Year 5: Students complete core and elective courses within their concentration while selecting specialized independent research activities.

Core Courses

Industry Law & Regulations
Quality Assurance & Risk Management
Project Delivery Systems
Cost Analysis and Management
Heavy Construction Estimating
Construction Procurement Systems

Safety Courses

Safety Risk Management
Leadership in Construction
Transportation Safety
Data-Driven Construction Health & Safety

Experiential learning includes planning studios / labs, internship, and fieldwork



Bachelor's Degree in Civil or Construction Engineering or Construction Management

Year 3-4

Year 4: Students take senior-level courses and fulfill internship, fieldwork, or senior capstone requirements. Core courses may include heavy equipment methods, structural elements, and project management.

Year 3: Students take specialized technology and core courses such as design, estimating and bidding, mechanics, and foundations.

GE Courses

Science, Social Sciences, Humanities & Arts and Foundational Courses

Construction-Related Courses

Materials & Testing Methods
Design, Information Modeling, Documentation
Budgeting and Finance
Project Planning & Scheduling

Safety-Related Courses

Construction Safety
Transportation Safety
Safety Management
Risk Assessment
Incident Investigation
Work Zone Traffic Control
Senior Capstone
Internship

Experiential learning includes design courses, labs, internships, & research

Associate's Degree in Civil or Construction Engineering Technology

Year 1-2

Year 1 and 2: Course requirements vary by institution. Students will complete institutional requirements for the degree sought. The Associate's degree will provide students with general education requirements as well as basic theoretical knowledge and practical skills in the chosen field. Students wishing to transfer into a 4-year degree program should work with an advisor early on to ensure they take all pre-requisite courses for their intended major.

General Education Courses

Students will develop writing, communication, math, and critical thinking skills.

Construction-Related Courses

AutoCAD
Surveying
Materials Structures & Properties
Concrete Technologies
GIS
Construction Docs & Specifications

Safety-Related Courses

Safety Management
Construction Safety
Incident Investigation
Risk Management

Transfer Program Prerequisites

Calculus
Chemistry I, II
Physics I, II
Applied Mechanics

Experiential learning includes labs, internships, co-ops, and fieldwork

Year 0



High School Diploma or G.E.D.

Construction or Engineering CTE coursework if available.

Experiential Learning & Professional Development Opportunities

Student professional associations provide professional development and networking opportunities to students, bridging coursework to practice. Many associations provide experiential learning opportunities like design/build or other student competitions; professional conferences and other networking opportunities, as well as student scholarships and other support. In addition, many institutions either require or strongly encourage work-based learning experiences for their students through internships and/or co-ops. This is particularly true for construction programs. Industry and education institutions can work together to ensure that safety-focused experiences and application of safety skills are an important component of these student development experiences. Relevant highway/road construction safety experiential and work-based learning is available through the following sources:

[Association of General Contractors \(AGC\)](#)

Student chapters of the Association of General Contractors exist at accredited two- and four-year schools offering programs in construction management, construction technology, and construction-related engineering. Membership in an AGC student chapter provides young professionals with an opportunity to observe and develop their skills alongside industry leaders. AGC sponsors contests for student chapters that apply construction knowledge to real-world problems. AGC's Foundation provides scholarships for undergraduates, graduate students, and students pursuing a technical degree or apprenticeship. Opportunities such as job shadowing and career fairs are available through state AGC chapters.

[American Society of Civil Engineers \(ASCE\) Student Chapters](#)

ASCE provides value to civil engineering and civil engineering technology students by expanding their network. Through volunteer opportunities, leadership resources, mentoring, student chapter meetings, scholarships, contests, and competitions, members meet colleagues who share a commitment to the civil engineering profession.

[Associated Schools of Construction \(ASC\)](#)

ASC is the professional association of construction educators and industry practitioners working together for the development and advancement of construction education. Student chapters of ASC exist at 143 four-year colleges and 9 two-year colleges. Regional competitions include a category for Heavy-Civil Construction.

[Construction Management Association of America \(CMAA\)](#)

Local chapters offer opportunities for students to learn about construction projects in their community and to network with members. Many chapters also offer scholarship funding.

[Transportation Development Foundation of the American Road and Transportation Builders Association](#)

The Student Transportation Construction Industry Video Contest experience helps students gain a better understanding of the importance of transportation infrastructure investment to the U.S. economy and quality of life and to learn more about the industry and potential career opportunities. The contest is open to post-secondary,

college, and graduate students. ARTBA also offers scholarships for post-secondary students and women at the undergraduate or graduate level; and training for construction personnel, including in safety.

[SkillsUSA](#)

A national non-profit, SkillsUSA serves teachers, high school, and college students preparing for careers in the skilled trades, and offers safety-focused resources and competitions.

[American Society of Safety Professionals \(ASSP\)](#)

ASSP is a global association of occupational safety professionals that advocates for safer work environments. It supports student chapters and provides scholarships, educational resources, and a student-focused Future Safety Leaders Conference among other professional development and networking opportunities.

[Occupational Safety & Health Administration \(OSHA\)](#)

In addition to offering a variety of safety-focused trainings, local OSHA offices provide safety-focused internships for students interested in safety.

[Municipal Public Works Departments](#)

Counties and cities offer opportunities for paid internships, co-ops, and externships. In externship situations, students spend one to three weeks with their hosts at their workplaces for a career exploration experience that usually includes networking, job shadowing, and a focus project. These experiences occur during semester breaks. It is important to emphasize that students can design their own externship experience.

[State Departments of Transportation](#)

DOTs offer internships for both community college, university and graduate students. Internships or co-ops are available in a number of occupations relating to asset management: civil engineering, construction, and maintenance. Some DOTs also employ college students to assist in the completion of seasonal work related to highway maintenance, crash system input and analysis, maintenance at roadside rest facilities, and flagging. Some training is provided on the job. DOTs offer rotational programs to entry-level engineers so that they experience different business areas within the organization before selecting a permanent assignment.

Innovative Strategies for Integrating Safety Competencies into Varied Programs of Study

A safety career pathway involves attaining specialized safety competencies within various traditional transportation programs of study. In addition to acquiring academic and technical preparedness within a broader field (e.g. Civil Engineering or Construction), students and incumbent workers on a safety career pathway will pursue research, experiential learning, on-the-job training and other work-based or real-world learning experiences focused on transportation safety. Examples of effective safety integration models are listed that provide curricular and co-curricular value to student safety career preparedness:

Co-Curricular

Transportation Agency/University Research Partnerships

Research partnerships between university faculty and state DOTs are proven sources for safety workforce development when they: 1) are implemented over the long-term; and 2) actively involve faculty and both undergraduate and graduate multi-disciplinary students in the implementation of safety research and project development.

On-Campus DOT Design Units

Many campuses partner with transportation agencies to provide on-campus internship experiences to undergraduate students in roadway design or traffic operations projects. These programs provide students with hands-on design experience and exposure to state DOT standards and practices while building a pipeline into transportation engineering careers.

Safety-Focused Work-Based Learning

Particularly in construction programs, many institutions either require or strongly encourage work-based learning experiences, which can be utilized to attain safety-focused experiences and to apply safety skills in the workplace.

Curricular

Engaged Scholarship

Most universities provide mechanisms to incorporate community projects into student coursework, either through senior design, capstone, or service learning courses. Engagement of transportation organizations with universities to provide safety-focused course-based projects can serve as a powerful student exposure and recruitment tool to safety career pathways. Some universities provide opportunities to scale up these types of engaged scholarship opportunities so that one agency partner can provide multiple projects over the course of an academic year.

Safety-Focused Course-Based Learning

Integration of safety topics and experiential learning into the classroom can be accomplished in various ways, including incorporation of safety-focused case studies and lab exercises into required coursework; and implementation of assignments that demonstrate understanding of safety principles and processes, through development of safety plans, safety data

analysis assignments, or implementation of accident investigations or safety audits. Job site visits and field trips have also been identified useful tools for promoting student interest in safety.

Students can design their own externship experience.

Competency-Based Curriculum

A curriculum that meets academic and quality standards, designed and organized by competencies required for jobs and cross-walked with industry skill standards and certifications, can be designed for safety. Job profiling and the use of "SMEs" should be considered to meet the competency needs of employers. The proliferation of industry-driven professional safety certifications can be used to facilitate this process. Programs of this kind may award credit for prior learning, allowing incumbent workers to achieve credentials by demonstrating knowledge and skills developed on-the-job.

Asynchronous Learning

Provide education and training for students and incumbent workers at times and locations convenient to students and employers, rather than instructors or institutions. This may include evenings or weekends, blended or "hybrid" delivery models, and delivery at off-campus locations.

Problem-Based Learning

Problem-based learning provides students with opportunities to solve real life problems, often in environments that replicate the workplace (e.g. design within constraints, working on multidisciplinary teams, etc.). Industry engagement with educators to provide real world problem examples and guidance on project constraints enhances student experience.

Work-Based and Experiential Learning

Incorporate opportunities for "learning-by-doing", including internships, co-op work experience, simulations, and team class projects that are assignments from local employers.

