# SECTION 1 Overview of Structural Drafting

### LESSON GUIDE: Unit 1 Introduction to Structural Drafting

## OBJECTIVES

After studying this unit, the student will be able to define structural drafting, identify the different types of structural drawings, list the most common employers of structural CAD technicians, demonstrate proper structural drafting techniques in the areas of linework, lettering, and scale use, and explain the use of CAD in structural drafting.

## POINTS TO EMPHASIZE

- Structural CAD technicians may be called upon to prepare either engineering drawings or shop drawings. Engineering drawings provide an overall picture of a structure for sales, marketing, estimating, or engineering purposes. Shop drawings are used to actually fabricate the structural products for a job.
- Engineering and shop drawings are prepared for four different types of structural products: steel, poured-in-place concrete, precast concrete, and wood. CAD technicians may work for firms that deal with all four products or for firms that specialize in just one of these products.
- Good linework, neat lettering, and accurate use of the scale are important traits for the structural CAD technician to develop.

## REVIEW QUESTIONS AND ANSWERS

1. Why are structural drawings needed in the heavy construction industry?
   *Any structure that is built results from the efforts of a number of specialists in several different areas. Drawings are needed so that all of the various people who build can build what the designer designs, who in turn needed drawings to design what the owner had in mind.*

2. Name two types of structural drawings.
   *Engineering and shop drawings*

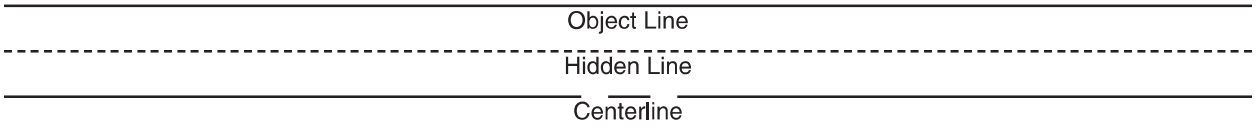
3. What do engineering drawings and shop drawings form when combined into one set?
   *Working drawings*

4. Name four different situations in which a structural CAD technician would be called upon to prepare engineering drawings.
   *When employed by an architect*
   *When employed by a contractor*
   *When employed by a structural engineer*
   *When employed in a sales department*

5. Shop drawings are prepared by what types of companies?
   *Companies that actually fabricate structural products—for example, structural steel and precast concrete companies*

6. Name the two most common employers of structural CAD technicians.
   *Consulting engineering firms and structural building product manufacturers (steel and precast concrete companies)*

7. Sketch an example of an object line, a hidden line, and a centerline.




8. List the three most commonly used sizes of paper in structural drafting.
   *B, C, and D sizes*

9. Explain the impact CAD has had on structural drafting.
   *CAD has improved drawing quality in structural drafting.*

## LESSON GUIDE: Unit 2 Typical Structural CAD Department

### OBJECTIVES

After studying this unit, the student will be familiar with the organizational chart for a typical structural CAD department, the job descriptions for the entry-level structural CAD technician, and the primary duties of the various positions found in a typical structural CAD department.

### POINTS TO EMPHASIZE

- Though position titles may vary from company to company, the responsibilities and duties required for positions are fairly constant. So, whether a beginning structural CAD technician is called a junior drafter or a detailer, the duties will be very similar.
- Students satisfactorily completing all of the activities in this book are qualified to begin work at the junior drafter or drafter level.

### REVIEW QUESTIONS AND ANSWERS

1. What positions are usually found in a typical structural CAD department?
   *Drafting clerk, junior drafter, drafter, senior drafter, checker, and chief drafter*

2. List the primary responsibilities of the drafting clerk.
   *Running prints, typing internal and external correspondence, filing, running errands, and maintaining the supply room*

3. List the primary responsibilities of the junior CAD technician.
   *Running prints, preparing elementary drawings, drawing details, performing revisions and corrections, and preparing bills of materials*

4. List the primary responsibilities of the CAD technician.
   *Preparing engineering and shop drawings, assisting junior drafters assigned to cooperative projects, ensuring adherence to projected timetables and work schedules*

5. List the primary responsibilities of the senior CAD technician.
   *Preparing more complicated engineering and shop drawings in accordance with company standard drafting procedures and the raw data available for a job, supervising drafters and junior drafters assigned to a job or drafting team, ensuring that projected timetables and work schedules are met, performing minor checking duties, and acting as liaison between the checker and project engineer assigned to a job*
6. List the primary responsibilities of the checker.
   *Checking drawings for dimensional accuracy, adherence to company drafting procedures, adherence to information presented in the raw data for the job, and general drafting technique*
7. List the primary responsibilities of the CAD manager.
   *Supervising all drafting department personnel, scheduling and assigning all work, ensuring that all functions of the drafting department are carried out properly and on time, reviewing new projects and estimating the amount of time that will be required to complete drawings, requisitioning supplies for the drafting department, and conducting interviews of prospective drafting department employees*

## LESSON GUIDE: Unit 3 Drawing, Checking, Correcting, and Revising Processes

### OBJECTIVE

After studying this unit, the student will be able to explain the various steps a structural drawing passes through from its origin to the completed stage.

### POINTS TO EMPHASIZE

- Structural CAD technicians begin the drawing process by preparing drawings from raw information supplied by architectural drawings, engineer's sketches, or information provided by contractors or sales personnel.
- Corrections are the result of a drafting or engineering mistake. Revisions are the result of the owner, architect, engineer, contractor, or other parties changing their minds about some aspect of a job.

### REVIEW QUESTIONS AND ANSWERS

1. Explain where structural CAD technicians get the raw data they use in preparing the structural drawings for a job.
   *From the architect's drawings, the engineer's sketches and verbal instructions, the contractor's sketches, and/or sales personnel sketches*
2. Who must approve structural drawings once they are complete?
   *The originator of the job (i.e., architect, engineer, or contractor)*
3. Explain how a correction and a revision differ.
   *A correction results from an error by the drafter or engineer. A revision results when the architect, engineer, or contractor changes his or her mind about some aspect of the job.*
4. What step immediately follows the preparation of the original drawings?
   *a. checking*