

# Construction Superintendent Skill Sets

**David E. Gunderson, Ph.D., CPC**

Washington State University  
Pullman, Washington

**Philip L. Barlow, M.S. and**

**Allan J. Hauck, Ph.D., CPC**

California Polytechnic State University  
San Luis Obispo, California

This is the first of a series of articles reviewing the results of an ongoing qualitative research project designed to document construction superintendent skill sets and develop postsecondary curricula to support superintendent education. Varying views of the role of the superintendent and an historical perspective are presented in a review of literature. The research methodology for the entire project, as well as this first phase, is presented. Data have been coded and analyzed from the interviews with seven superintendents to date and the results of these analyses are provided. Themes that emerged in these interviews include people skills, understanding the work and sequencing, organizational and managerial skills, scheduling, estimating, cost control/awareness, work ethic, and learning from other people. Insights into how the role of the superintendent has changed and the preparation needed for future superintendents also are provided from these interviews. These preliminary results indicate there is a role for colleges and universities in developing these skill sets, and that construction superintendents now are doing tasks formerly thought to be the responsibility of project managers. The Technology Age coupled with our litigious society is forcing the construction superintendent into a new role.

**Keywords:** construction superintendent, construction supervision, project superintendent, construction skills

## Introduction

“The [construction] job superintendent is like the conductor of a symphony orchestra. He must see that all elements are fitted together at the right time and sequence” (Diamant & Debo, 1988, p. 8). This construction conductor is responsible for the on-time and within budget completion of construction projects. The superintendent plays a key role in the completion of the built environment. “The phrase **built environment** refers to the manmade surroundings that provide the setting for human activity, ranging from the large-scale civic surroundings to the personal places” (Wikipedia, 2006). There are common threads that weave through different authors’ perception of the role that the project superintendent plays in the construction process. Conversely, there are also some subtle differences. The common threads focus on the supervisory role of the construction superintendent, and the main difference seems to be related to the recent changes in the background of these professionals. Schaufelberger and Holm (2002) state, “The *superintendent* is responsible for the direct daily supervision of construction activities on the project, whether the work is performed by the contractor’s workers or those employed by subcontractors” (p. 9). Mincks and Johnston (2004) focus on the superintendent’s field knowledge stating that regardless of the project delivery method chosen, “the superintendent is responsible for the correct, timely, and profitable construction of the project. It is the superintendent’s responsibility to coordinate labor, material, equipment and subcontractors” during construction. The functional role has “the necessary skills and understanding of common construction methods and practices” (p. 24). Schexnayder and Mayo (2004) focus more on the superintendents’ field experience when they state, “Superintendents

often come up through the trades, and have many years of experience. Their primary function is to coordinate the field work and supervise the trade foremen” (p. 73). Gould and Joyce (2002) identify the changing source of superintendents stating that traditionally superintendents “were people from the trades themselves, working their way up to a management position. Recently, however, more superintendents have been hired out of college engineering or construction management programs” (p. 50). This research focuses on the skill sets needed by today’s construction superintendent and the skill sets they may need in the future. Providing a history of the project superintendent’s role in the construction process may lead to a more thorough understanding of the trends intertwined through the changing skill sets needed today.

### **History of the Construction Superintendent**

The term Superintendent has not always referred to the individual who works for the contractor and directs the work to complete the construction of any aspect of the built environment. Clark (1893) wrote a guide for young architects responsible for inspecting work done by the contractor. These young architects were responsible for “building superintendence”. Clark states:

To the young architect ..... a manual which may help to direct his attention to all the various details which should be noticed, and put him in mind of the defects to be looked for at each stage of a given construction, cannot fail to be of use, and such a manual, it is hoped, the following pages will supply (p. 3).

The focuses of Clark’s manual are the construction details and the sequence of activities in various types of construction rather than the supervision of work done by the contractor’s craftsmen. Clark’s introduction explains, “The general subject of superintendence will be considered under the three heads of Stone Buildings, Wooden Buildings and Brick Buildings” (p. 3). Clark (1893) does refer to the skills needed by today’s superintendent when he states:

All who have had any experience in the supervision of building operations know the importance of having a systematic plan in pursuing their examination of any given work, and the difficulty, without such aid, of giving adequate attention to all the innumerable points of construction which require notice at their proper time, and before they are covered up or built over, so as to make changes inconvenient or impossible. (p. 3)

Design and construction responsibilities were separated by practice during the last half of the 19th century and by legislative action in 1935. The Miller Act “requires a contractor on a federal project exceeding \$100,000 to post two bonds: a performance bond and a labor and material payment bond” (Beard, Loulakis & Wundram, 2001, p. 21). Beard, et al. explain that these bonds require the company to have capital and it is the requirement for this capital “that has prevented or discouraged professional design firms from acting as construction contractors” (p. 21). The capital required by the bonding companies is needed to cover the liabilities associated with the construction project. Contractors almost always have been liable for the construction. Even prior to the emergence of the master builder, Hammurabi, ruler of Babylon (1795 – 1750 B.C.), developed a set of codes which delineated the constructor’s liability:

- If a builder build a house for someone and does not construct it properly, and the house. Which he built, fall and kill its owner, then the builder shall be put to death.
- If it kill a son of the owner, the son of the builder shall be put to death.
- If it kill a slave of the owner, then he shall pay slave for slave to the owner of the house.
- If it ruin goods, he shall make compensation for all that has been ruined, and inasmuch as he did not construct properly the house which he built and it fell, he shall re-erect the house from his own means.
- If a builder build a house for someone, even though he has not yet completed it; if then the walls seem toppling, the builder must make the walls solid from his own means. (Beard, Loulakis & Wundram, 2001, p. 15)

These codes established by Hammurabi about 4,000 years ago help us realize that builders have always been subject to liability and risk. From at least Hammurabi's time through the middle ages to the late 19th century, the master builder was responsible for design and construction including the superintendence of work done by apprentices and journeymen (Andrews, 1992).

Today risk and liability for construction is legally delegated to specialty contractors, most often working for the general contractor as subcontractors. This emergence of the specialty contractor has been caused in part because of the increased complexity of the built environment (Mulligan & Knutson, 2000). Mulligan and Knutson make the assertion that the increased sophistication of today's structures and "societal demands" are too much for one individual to encompass. This increase in specialization accommodates the increased structural and societal complexities.

It is speculative to try and identify why the role of the construction superintendent is changing. A good list of reasons might include the Technology Age, and the sophistication and training required to implement the new technology. Our litigious society along with government regulation and public perception certainly plays a role in how we build today. Another reason might be societal in nature, the disappearance of the middle class and the demographics of the construction work force.

To continue our superintendent journey into the future, this paper is proposing the superintendent of tomorrow will come less frequently from the trades and more often from colleges and universities. The genesis for this is due to many reasons including the skill sets and job requirements of today's superintendents. The essence of this research project is to identify these skill sets and begin to understand where the role of superintendent is now and in the future.

### **Research Methodology**

This paper documents the very beginnings of Phase IA of research about the project superintendent skill sets required in the construction industry. The anticipated phases are:

- Phase IA – Interviews with Construction Superintendents
- Phase IB – Site Observations Chronicling the Daily Activities
- Phase II – Interviews with Project Managers
- Phase III – Interviews with Operations Managers
- Phase IV – Second Round Interviews with Construction Superintendents

Phase IA, interviews with project superintendents, is primarily qualitative research. Open ended questions allow themes surrounding superintendent skill sets to emerge. Prior to starting the research, the protocol needed Institutional Review Board (IRB) approval. The human subjects research protocol was submitted to the Institutional Review Board (IRB) on June 1, 2006 and approved June 23rd.

### *Population Sampling*

The theoretical population for Phase IA of the research is all project superintendents working on commercial construction projects in the United States. No limits on the size of construction projects or annual volume of the construction company have been established. There is not a minimum number of years of experience an individual has as a superintendent to qualify to be a participant.

The superintendents who consented to the interview were selected by a combination of methods. The researchers first used purposive sampling. In purposive sampling “the participants are hand picked from the accessible population” (Gliner & Morgan, 2000, p.154). The participants were selected because of their experience as project superintendents for commercial construction projects. It is anticipated that, as Phase IA continues, the participants will include superintendents working in other parts of the United States.

Convenience sampling also was used to solicit participants as Phase IA began. In convenience sampling, “the participants are selected on the basis of convenience rather than chosen in a serious attempt to select participants who are representative of the theoretical population” (Gliner & Morgan, 2000, p.155). Superintendents working for companies in areas close to the researchers and/or companies recruiting at the universities where the researchers are teaching were given the opportunity to volunteer for participation.

### *Delimitations*

At this point of the research, the focus is delimited to superintendents with the majority of their experience in commercial construction. In the future, research on superintendent skill sets could be expanded to other types of construction such as residential, heavy-civil, or industrial. Although not by design, delimitations at this point of the research also have included area of the country. Interviews with superintendents have been limited to the western portion of the United States. It is anticipated that superintendents working in all parts of the country will be interviewed to check for consistency in the data.

### *Interviews with Project Superintendents*

Seven interviews, two in person and five over the telephone, were conducted. In both types of interviews, the questions and answers were tape recorded and transcribed in preparation for data analysis. The interview included demographic questions including how long the participant has worked in construction, how long they have worked as a superintendent, the types of projects on which they have worked, and the type of project delivery method employed on those projects.

The participants were asked to identify the skill sets required by project superintendents, and how those required skill sets have changed over the past 10 years. They also were asked how they think those required skill sets will change in the future. (See Interview Questions as listed in Appendix A.)

### *Data Analysis*

The tape recorded interviews were transcribed. Names of construction companies and individuals were deleted to maintain confidentiality. A constant comparative approach (Bogdan & Biklen, 2003) was used after each interview was coded to “look for key issues, recurrent events, or activities in the data that become categories of focus” (p. 67). The data from the open ended interviews were coded with open, axial, and selective codes using a combined deductive and inductive approach. Patton (2002) states, “Discovery and verification mean moving back and forth between induction and deduction, between experience and reflection on experience, and between greater and lesser degrees of naturalistic inquiry” (p. 67). Although the questions asked during the interview (refer to Appendix A) were pointed in an effort to gather specific information about the skills needed by superintendents to direct work on the job site, the questions were also open ended enough to allow participants to explore aspects of the superintendent’s role not preconceived by the researchers.

## **Research Results**

The seven project superintendents interviewed to date are only a small number of participants who will eventually be interviewed as part of Phase IA of this research. It is anticipated that, as more participants from across the country are interviewed, the geographic variable will be minimized.

### *Demographic Information*

The seven superintendents interviewed were working in Alaska, California, or Washington. Some of the demographic information for the seven superintendents interviewed is presented in Table 1.

Table 1

#### *Participant Demographics*

	Total Years	Average Years	Most Experience	Least Experience
Years in Construction	218	31.14	47	23
Years as a Superintendent	152	21.71	35	10

Only one of the seven participants had graduated from college, and that individual’s degree was not directly related to construction. Another participant stated, “The last education I had was in 10th grade.” This wide range of formal education among the participants did not produce a wide range of differences in the data. All of the participants came “up through the ranks” starting as a carpenter.

### *Superintendent Skill Sets*

The participants identified several skills required by a construction superintendent. The skill set that emerged as the most important is “people skills”. Other skills include “understanding the work and sequencing”, “organizational and managerial skills”, “scheduling”, “estimating”, and “cost control/awareness”. It must be emphasized that these are preliminary results from research in progress and results cannot be generalized to a larger population at the early stages of the research.

#### *People Skills*

Every participant stated that people skills were very important to the success of a construction superintendent, and several participants believed that it is the most important skill set. When asked what the most important skill set was, one participant responded, “People skills because if you don’t have it you won’t have a successful project.” Later in the interview this same superintendent stated, “You can have the education and the knowledge, but without people skills, you can’t really apply it.” The participants identified people skills as being multi-faceted. They require building trust, being a good teacher, and being a good communicator. A superintendent must be able to work with a diverse group of individuals. One participant stated that different people like to be managed in different ways when he stated, “Some guys want you to scream at them and some want to hear that they’re doing a great job.” Another participant referred to the diverse people that a superintendent has to manage stating, “You’re dealing with multiple-personalities.” Several participants stated that superintendents need to be able to get along with people including subcontractors, architects, and owners.

#### *Understanding the Work and Sequencing*

Almost all of the participants believed that understanding the work and the sequencing of different work is critical to being a successful superintendent. One participant stated, “You [the superintendent] need to know each facet of work.” Another participant stated that the superintendent must have “knowledge of the industry and knowing the different methods.” This opinion was echoed by the opinion of a participant who felt that the superintendent does not need to know “how long every footing is, or where every bolt is, or how long every beam is, but you have to know how and when those pieces have to be in place.” Several participants believed that this knowledge of construction includes understanding the basic practices of different subcontractors’ work. Having knowledge of subcontractors’ work facilitates the sequencing of work on the project – proper planning of activities performed in a “timely sequence so the subcontractors can make money.” Another participant emphasized the importance of a superintendent understanding the work done by the mechanical and electrical subcontractors.

#### *Scheduling, Estimating, and Cost Control*

The ability to schedule the work, estimate the cost of the work, and control those costs throughout the project are skills several of the participants identified as important for a superintendent to be successful. One superintendent stated, “Elements that are really critical

[are] estimating and scheduling, because if you don't know how to schedule, you won't be able to put a building together, so scheduling, communication, leadership and estimating [are] probably the four elements I think that are very important." When asked what the most important skill set was, another participant responded, "I think the most important would be able to schedule jobs."

### *Work Ethic*

Three out of the seven participants indicated that having a strong work ethic is a good attribute for a construction superintendent. One participant described the work ethic when he stated, "You do what it takes to get the job done." But another participant felt that our culture, with respect to work ethic, is changing when he stated, "It's not the same as it was 20 years ago." Another superintendent felt another aspect of work ethic, persistence, is important for success as a superintendent. He stated, "You can do anything you want as long as you put your mind to it."

### *Learning from Other People*

Most of the participants emphasized the importance of learning from other people with whom a superintendent, or future superintendent, is working. The people from whom superintendents can learn are at all levels of the project. One participant emphasized the importance of learning from others when he stated, "Listen to the people above you and below you." This participant, as well as other participants, believed that learning from subcontractors is important. One participant felt that a lot can be learned by watching other people work. He indicated that a superintendent can get a sense for activity durations when he stated, "You'll get to know how long it takes for whatever, 2 men or 6 men, to get work done." He also stated, "You see a group of block layers building a wall; you're going to build a wall 40 feet long by 15 feet high. Just take a mental note of how long it takes them to do that because that's going to be a big part of scheduling."

## **How the Superintendent Position has Changed**

### *More Paperwork*

Participants said the tasks and duties that keep a superintendent busy throughout the day have changed over the last 10 to 20 years. Several participants indicated that there is much more paperwork for which the project superintendent is responsible. One participant emphasized this increase when he stated, "The paper work has just, oh I'll bet it's 10 times more [than] it was 10 years ago."

### *More Managerial Responsibilities*

One participant stated, "As a superintendent, we're far more involved in the management, in the dealing with owners, than we used to be." Another superintendent compared the time in the field to the time in the job site office when he stated that he used to spend 6 hours in the field and now

he spends 1 hour. This change is because there are more managerial responsibilities for the superintendent.

#### *Must be Computer Literate*

Almost all participants indicated that a superintendent must now be computer literate, which is a big change from 10 years ago. One participant stated that now the construction industry “is fluent in the computer age.” Another participant detailed this change when he stated that now a superintendent will send an e-mail rather than make a phone call. This change in communication methodology has facilitated the speed with which we communicate; one superintendent stated that we are sending information faster.

#### *Increased Emphasis on Safety*

The majority of the participants stated that there is an increased emphasis on safety over the past 10 years. This was emphasized by one superintendent when he stated, “There is a dramatic drop in injuries today than in the past.” This was confirmed by another superintendent when he stated, “Back then, 10 years ago, people were getting killed all the time and then the insurance rates started going up and then it became unacceptable for general contractors to get anybody hurt.”

#### *Increased Reliance on Foremen*

Several participants believed that, since today’s superintendents are more involved in project management activities, more reliance on foremen and the need to trust the foremen are required. This reliance was emphasized when one participant stated, “I’m just lucky. The past 10 or 15 years I always had a good foreman.”

#### *Source of Construction Personnel*

One superintendent stated that one of the ways in which the superintendent’s position has changed is that “we’re getting them from colleges.” This superintendent believed that this change has been facilitated by educational opportunities. He stated, “In the past there were very few schools that had construction management programs.” This opinion was confirmed by another participant when he stated, “In the future a superintendent can be coming out of college rather than out of a trade.” This look to the future leads to a discussion about participants’ recommendations for preparing young people for the superintendent’s position.

### **Preparation for Becoming a Superintendent**

There are two major themes that emerged from the data analysis that describes the preparation required for young people to become a superintendent in the future. The first theme focused on education and the second theme focused on construction experience.

### *Education*

All of the participants felt there is a place in the college or university for providing education to future superintendents. The topics these participants felt are good to be learned in school are scheduling, estimating, communication, writing and English, people skills, and sustainable construction materials and methods including LEED (Leadership in Energy and Environmental Design) certification. One participant stated that a construction management college education is just as helpful as learning a trade. Another superintendent believed that preparation for becoming a superintendent includes a construction management or a civil engineering degree. Participants also believed there is another type of education that can only be gained over time as an individual works on construction projects.

### *Construction Experience*

The participants felt internships, also referred to at some universities as co-ops, are one aspect of the college experience that provides a positive preparation to be a superintendent. Every participant expressed the same opinion in different words: there is no substitute for construction experience as a person prepares to be a superintendent. One superintendent emphasized the importance of learning from each other when he stated, “College superintendents give a lot of computer skills to the craft superintendent, and that one helps him learn how to build the actual job.” This superintendent felt that we still will have superintendents coming up through the trades in the future. The importance of learning a trade was emphasized by another participant who stated, “I think a little more education wouldn’t be bad, I mean like your construction management program. Maybe I’m old school, but I think a guy ought to be of a trade to be a superintendent.” A shifting trend in where superintendents will come from was identified by the participant who stated, “There will still be [superintendents] coming from the fields and the trades, but I think we will see a lot more coming from college.”

### **Conclusions and Discussion**

The research into superintendent skill sets and the development of postsecondary curricula to support construction superintendent education is just getting started. This preliminary research indicated there is a place in colleges and universities to educate young people about the skill sets required to be a superintendent. This preliminary research also indicated that superintendents are doing tasks that heretofore were thought to be the responsibility of the construction project manager. One of the next phases of the research will be interviews with project managers who may or may not corroborate this trend.

This research will continue interviews with project superintendents from different parts of the United States to try and eliminate geographic demographics as a variable. Based on these preliminary data gathered and analyzed, a quantitative aspect will be added to the interview to quantify as well as qualify the skill sets needs by construction project superintendents to be successful.

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## Appendix A – Interview Questions

How many years have you worked in the construction industry?

How many years have you worked as a project superintendent?

Describe your work experience leading up to your work as a project superintendent.

Describe your education (formal, informal, union training, etc.) leading up to your work as a project superintendent.

Describe the projects on which you have worked as a project superintendent during the past 5 to 10 years. Helpful information would include the type of project (commercial, residential, heavy-civil, industrial) the type of construction contract/delivery method (design-bid-build, design-build, and CM-at-risk), and the geographic location.

Describe the skill sets that you believe are required for an individual to work as a construction superintendent. Be specific about technical and administration skills that you feel may be required.

Based on this list of skill sets, which is the most important, and which are the top three in terms of making an individual a successful superintendent?

Do you have any advice for someone considering working toward being a construction superintendent?

If you had your career to do all over again, is there anything that you would do differently?

Do you have any comments that you would like to add regarding work as a construction superintendent and/or skill sets required by individuals working as a construction project superintendent?

How has the position of project superintendent (and skill sets required for this position) changed over the past 10 years?

How do you think the required skill sets for a construction superintendent will change in the future?

What do you think would be the ideal preparation for the construction superintendent of tomorrow?

Is there a place for university level training and education in the preparation of future superintendents?

Are there any manuals, books, subscriptions, etc. that you use/utilize on a regular basis to enhance your work as a superintendent?

What managerial tools/equipment (copy machine, phone, fax, computer, PDA, tape recorder, cell phone, two-way radios, etc.) do you need to do your job well?