

Superintendent Competencies and Attributes: First Look at a National Study

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This manuscript reports the preliminary results of the third phase of the exploratory sequential mixed methods research intended to determine the competencies and attributes required by a construction superintendent to be successful. Surveys were completed by 469 participants working in commercial, residential, heavy-civil, mechanical, electrical, and metal stud and drywall aspects of the construction industry. The 77% response rate may indicate interest in the subject. Participants included superintendents, project managers, project engineers, vice presidents and presidents. As ranked by all participants, the top twenty competencies or attributes required for a construction superintendent to be successful on a project included: 1. Ability to plan ahead; 2. Ability to schedule work activities; 3. A strong work ethic; 4. Ability to get along with other people; 5. Leadership skills; 6. Reliable and responsive; 7. Strong values and ethics; 8. Understand safety regulations; 9. Understand construction materials; 10. Oral communication skills; 11. Broad construction knowledge; 12. Ability to work with different (diverse) people; 13. Ability to collaborate; 14. Ability to build trust; 15. Reinforce behavior in other people; 16. Detailed knowledge of construction; 17. Ability to “keep your cool”; 18. Time management skills; 19. Team building skills; 20. Listening skills.

Key Words: construction superintendent, construction supervision, project superintendent, construction skills, mixed methods research

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 (Gunderson, 2008). There are common threads that weave through different authors’ perceptions 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). 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.” In recent years “more superintendents have been hired out of college engineering or construction management programs” (p. 50).

This research focuses on the competencies (also referred to as skill sets) and attributes needed by today’s construction superintendent to be successful. The first article in this series (Gunderson, Barlow & Hauck, 2007) provided a history of the project superintendent’s role in the construction process. The second article in this series (Gunderson, 2008) presented criteria for success. The following are those criteria which help define success for a superintendent. Webster’s Third New International Dictionary (1993) defines success as “the degree or measure of attaining a desired end” (p. 2,282). Sanvido, Grobber, Parfitt, Guvenis, and Coyle (1992) determined the contractor’s criteria for project success to include: “meet the schedule; project profit; under budget including savings for the owner or the contractor; quality met or exceeded; no claims and/or litigation; safety; client satisfaction; good subcontractor buy out; good direct communication; and minimal or no surprises during the project” (p. 96). The

success of a project is the responsibility of the construction team leaders, the project manager and the superintendent. Clough, Sears and Sears (2005) state, "In practice, construction project authority is wielded much as a partnership effort, with the project manager and the project superintendent functioning as allied equals" (p. 285). The list of success factors generated by Sanvido et. al. (1992) is presented in Table 1. Different construction companies delegate responsibility and authority in different ways. Table 1 is the authors' attempt at summarizing how the responsibility for project success is often delegated.

Table 1: Criteria Leading to Project Success

<i>Contractor's Criteria for Project Success</i>	<i>Responsible Person</i>
Meet the Schedule	Superintendent
Project Profit	Project Manager and Superintendent
Under Budget (including savings for the owner or contractor)	Project Manager and Superintendent
Quality Met or Exceeded	Superintendent
No Claims and/or Litigation	Project Manager and Superintendent
Safety	Superintendent
Client Satisfaction	Project Manager and Superintendent
Good Subcontractor Buy Out	Project Manager
Good Direct Communication	Project Manager and Superintendent
Minimal or No Surprises during the Project	Project Manager and Superintendent

(Gunderson, 2008)

"This delegation of responsibility varies from company to company and from project to project. Although arguable, the project superintendent is responsible or shares responsibility with the project manager for nine of the 10 criteria leading to project success. Since the superintendent has a key role in the success of a construction project, the competencies and attributes that make that individual successful are very important" (Gunderson, 2008, p. xxx).

Research Methodology

This research is focused on the project superintendent competencies and attributes required to be successful in the construction industry. The phases, which were revised after Phase I and again after Phase II, currently include:

- Phase I – Interviews with Construction Superintendents (n = 7)
- Phase II – Interviews with Construction Superintendents with a Quantitative Ranking Instrument (n = 14)
- Phase III – Survey sent to 608 Construction Superintendents, Project Engineers, Project Managers, Vice Presidents, and Presidents (n = 469)

Phase I Research Methods

Phase I, interviews with seven project superintendents, was primarily qualitative research. Open-ended questions allowed themes surrounding superintendent competencies and attributes to emerge.

Phase I Delimitations

The Phase I research focus was delimited to superintendents with the majority of their experience in commercial construction. Although not by design, but simply for convenience, delimitations for Phase I of the research also included area of the country; interviews were limited to the western portion of the United States.

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 (Gunderson, Barlow & Hauck, 2007, p. 574-575).

Phase II Research Methods

In Phase II of the research, the focus continued to be delimited to superintendents with the majority of their experience in commercial construction. In future phases, research on superintendent skill sets will be expanded to other types of construction such as residential, heavy-civil, or industrial, and to specialty construction superintendents such as mechanical and electrical. For the sake of convenience rather than design, delimitations at this point of the research also included area of the country. Interviews were limited to superintendents working in Alaska, Northern and Southern California, Colorado, Montana, Oregon, and Washington.

Interviews with Project Superintendents

Fourteen interviews, 13 face-to-face and one by telephone, were conducted as part of Phase II data collection. In both types of interviews, the questions and answers were tape recorded and transcribed in preparation for data analysis. The interview included demographic questions such as how long the participants had worked in construction, how long they had worked as a superintendent, the types of projects on which they had 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. At the end of the interview the superintendents were asked to rank the list of skills sets and attributes.

Phase III Research Methods

The intent of Phase III was to expand the number of variables and reduce some of the delimitations imposed in the first two research phases. The research results from Phases I and II informed the primarily quantitative survey instrument with embedded open-ended questions. Figure 1 adapts how Creswell and Plano Clark (2011, p. 69) graphically illustrate an exploratory sequential mixed methods research design to apply to conducting the research protocol for this project.

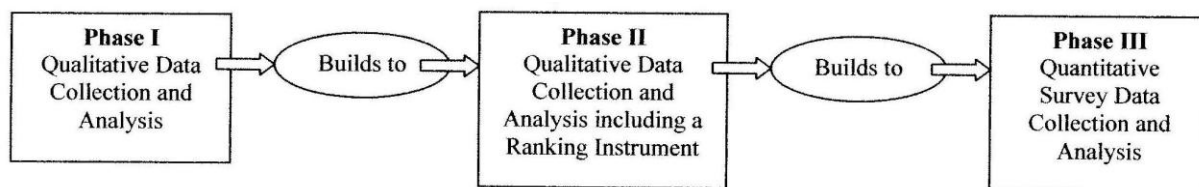


Figure 1: Exploratory Sequential Mixed Methods Protocol for this Project

After receiving Institutional Review Board approval for the research protocol on February 19, 2010, the research team worked with the Social & Economic Sciences Research Center at Washington State University to develop a web-based survey instrument. E-mail invitations were used to solicit participants. The researchers used purposive sampling combined with a modified snowball sampling to get participants. In purposive sampling “the participants are hand picked from the accessible population” (Gliner, Morgan & Leech, 2009, p.124). In snowball sampling the participants selected are “asked for references or names of other people they may know who fit into the same category” (Gliner, Morgan & Leech, 2009, p.125). In this protocol the purposive selected participants were asked to forward the e-mail invitation to colleagues in the construction industry.

Phase III Participant Selection

The participants were selected because of their experience as project superintendents, project engineers, project managers, company vice presidents or presidents. The participants were also selected because of their experience working on commercial, heavy civil, industrial, multi-family residential, single-family residential, mechanical, electrical, and/or drywall and framing construction projects. Individuals working for a construction management agency firm were also asked to participate. The participant solicitation used is an example of nonprobability sampling. Nonprobability sampling is often used “because there is no sampling frame or list of members of the

accessible population” (Gliner, Morgan & Leech, 2009, p.122) and “it may not be possible to do a probability sample of the participants” (p. 125). At this point the authors have not established external validity and therefore will not generalize the results to a larger population.

The job titles held by the participants are listed in Table 2. The participants were asked to check all positions they had held in their construction careers.

Table 2: Participant Categories

Participant Categories	Participants	Participant Categories	Participants
All Participants	469	Project Managers	296
Superintendents	257	Vice Presidents	122
Site Managers	91	Presidents	71
Project Engineers	208		

The participants also had the option of checking “other” four times. Participants selected foreman 23 times.

In addition to quantifying the participants’ job titles up to this point in their construction careers, they were also asked to check the sectors or divisions within the construction industry in which they are currently working. This demographic information is presented in Table 3. The construction firm for which the participants are working often does business in multiple sectors within the construction industry. This business strategy diversity is reflected in Table 3.

Table 3: Participants Working in Construction Sectors

Participant Categories	Participants	Participant Categories	Participants
All Participants	469	Mechanical Construction	34
Construction Management Agency	139	Electrical Construction	32
Commercial Construction	329	Drywall & Framing Construction	17
Industrial Construction	180	Multi-Family Residential Construction	90
Heavy Civil Construction	104	Single-Family Residential Construction	26

Phase III Response Rate

The research team sent out 608 e-mails soliciting participants, and received 469 responses. Current research indicates that a response rate of 77% can be considered an acceptable response rate (Kaplowitz, Hadlock, & Levine, 2004; Mertler, 2003; Porter & Whitcomb, 2003). The cited authors consider a response rate above 20% to be acceptable for e-mail and web-based surveys. Dillman, Smyth and Christian (2009) consider a response rate below 50% to be low and may indicate a nonresponse error. “Nonresponse error occurs when people selected for the survey who do not respond are different from those who do respond” (p.17). It is not possible to determine differences in participants who responded and those who did not respond. The authors consider the response rate to be good and that it may indicate a strong interest in the topic among those asked to participate.

Research Results

Phase I Research Results

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.

How the Superintendent Position has Changed

Phases I and II of this research (Gunderson, Barlow & Hauck, 2007; Gunderson, 2008) reported themes which emerged in response to the question, “How has the superintendent position changed in the last 10 years?” Table 4 presents these themes.

Table 4: How the Superintendent Position has Changed

More paperwork	Must be computer literate	Increased reliance on foremen
More managerial responsibilities	Increased emphasis on safety	Source of construction personnel

These themes, coupled with selected American Council of Construction Education (ACCE) curricula content requirements, were used to develop the quantitative ranking instrument. The revised research protocol, adding the quantitative ranking instrument to the Phase II interviews, was approved by the Institutional Review Board on June 21, 2007.

Phase II Research Results

In Phase II of the data collection the participants were asked to select 10 skill sets or attributes most important to the success of a construction superintendent. Then they were asked to rank those 10 selected skill sets or attributes from 1 to 10 with 1 being the most important. The list was generated from interviews with superintendents in Phase I of the research. Table 5 provides the results for the ranked superintendent skills sets and attributes.

Table 5: Superintendent Competencies or Attributes Ranking

<i>Rank</i>	<i>Competency or Attribute Description</i>	<i>Rank</i>	<i>Competency or Attribute Description</i>
1	Oral Communication	16	Trust Building
2	Leadership	17	Time Management
3	Scheduling	17	Written Communication
4	Strong Values and Ethics	19	Ability to “Keep your Cool”
5	Ability to Plan Ahead	20	Reinforcing Behaviors
6	Detailed Knowledge of Construction	21	Strong Work Ethic
7	Team Building	22	Collaboration
8	Broad Knowledge of Construction	23	Understand Materials
9	Computer Skills	23	Good with Numbers
10	Listening Skills	25	Conceptualization
10	Cost Control	26	Get Along with People
12	Ability to Work with Different Kinds of People	27	Estimating
13	Understand Subcontractors’ Work	27	Typing Skills
14	Ability to Teach	27	Ability to Sketch
15	Ability to Learn from Others		

(Gunderson, 2008)

The results of data analysis from the Phase II interviews confirmed the results in Phase I. The same themes emerged regarding the competencies and attributes required for a construction superintendent to be successful and the trends in the industry. The ranking tool helped place level of importance on the competencies and attributes and also informed the Phase III survey instrument.

Phase III Research Results

A total of 459 participants responded to the question “How many total years have you been working in the construction industry?” These 459 participants have worked in the construction industry an average 25.9 years with the median being 27 years. Table 6 summarizes the total number of years participants have worked in the construction industry.

Table 6: Years of Construction Experience

Years in Construction	Number of Participants	Years in Construction	Number of Participants	Years in Construction	Number of Participants
50 or more years	6	30 – 39 years	143	10 – 19 years	100
40 – 49 years	52	20 – 29 years	124	1 – 9 years	34

Participants were presented with a list of 42 competencies and attributes and were given the following instructions: The following is a list of skill sets and personal traits that may or may not be important to a Construction Superintendent's success in managing a construction project. Please circle the number that corresponds to the importance of each item with 6 being most important, 1 being least important, and 0 being not important.

The six point Likert scale also identified 0 as being "Not Important". The responses from all participants are presented in Table 7.

Table 7: All Participants Responses – Superintendent's Competencies & Attributes

Rank	Superintendent Competency or Attribute Required for Success	N	Minimum	Maximum	Mean	Std. Dev.
1	Ability to Plan Ahead	460	3	6	5.80	.454
2	Ability to Schedule Work Activities	463	3	6	5.68	.551
3	Strong Work Ethic	469	3	6	5.66	.541
4	Ability to Get Along with Others	467	3	6	5.65	.632
5	Leadership Skills	461	3	6	5.61	.573
6	Reliable and Responsive	460	3	6	5.61	.585
7	Strong Values and Ethics	464	2	6	5.58	.656
8	Understand Safety Regulations	461	3	6	5.54	.663
9	Understand Construction Materials	468	2	6	5.54	.632
10	Oral Communication Skills	460	2	6	5.45	.660
11	Broad Construction Knowledge	465	2	6	5.44	.729
12	Ability to Work with Different People	465	3	6	5.42	.690
13	Collaboration Ability	469	2	6	5.38	.729
14	Trust Building	464	2	6	5.37	.690
15	Reinforces Behavior in Others	469	2	6	5.35	.758
16	Detailed Knowledge of Construction	465	1	6	5.35	.729
17	Ability to Keep Your Cool	467	0	6	5.31	.793
18	Time Management	469	2	6	5.31	.782
19	Team Building Skills	465	2	6	5.31	.797
20	Listening Skills	465	2	6	5.30	.751

Looking at the opinions of participants who have worked in different positions in the construction industry did not yield significantly different results. Table 8 presents company president or CEO opinions about what competencies or attributes are required for success.

Table 8: President or CEO Opinions – Superintendent's Required Competencies & Attributes

Rank	Superintendent Competency or Attribute Required for Success	Mean	Rank	Superintendent Competency or Attribute Required for Success	Mean
1	Ability to Get Along with Others	5.82	11	Trust Building	5.43
2	Ability to Plan Ahead	5.79	12	Listening Skills	5.42
3	Strong Work Ethic	5.70	13	Ability to Work with Different People	5.42
4	Ability to Schedule Work Activities	5.68	14	Collaboration Ability	5.39
5	Strong Values and Ethics	5.68	15	Understand Safety Regulations	5.39
6	Reliable and Responsive	5.67	16	Reinforces Behavior in Others	5.38
7	Leadership Skills	5.58	17	Time Management	5.38
8	Understand Construction Materials	5.51	18	Team Building Skills	5.37
9	Broad Construction Knowledge	5.46	19	Ability to Keep Your Cool	5.37
10	Oral Communication Skills	5.45	20	Sense of Urgency	5.36

Table 9 presents company vice president opinions about what competencies or attributes are required for success; Table 10 presents project manager opinions about what competencies or attributes are required for success; and Table 11 presents superintendent opinions about what competencies or attributes are required for success.

Table 9: Vice President Opinions – Superintendent’s Required Competencies & Attributes

Rank	Superintendent Competency or Attribute Required for Success	Mean	Rank	Superintendent Competency or Attribute Required for Success	Mean
1	Ability to Plan Ahead	5.89	11	Ability to Work with Different People	5.48
2	Ability to Get Along with Others	5.76	12	Reinforces Behavior in Others	5.44
3	Ability to Schedule Work Activities	5.75	13	Oral Communication Skills	5.43
4	Reliable and Responsive	5.72	14	Collaboration Ability	5.43
5	Leadership Skills	5.68	15	Detailed Knowledge of Construction	5.43
6	Strong Work Ethic	5.67	16	Listening Skills	5.42
7	Strong Values and Ethics	5.65	17	Trust Building	5.40
8	Understand Safety Regulations	5.57	18	Ability to Keep Your Cool	5.38
9	Understand Construction Materials	5.52	19	Team Building Skills	5.37
10	Broad Construction Knowledge	5.49	20	Visualization in 3D	5.35

Table 10: Project Manager Opinions – Superintendent’s Required Competencies & Attributes

Rank	Superintendent Competency or Attribute Required for Success	Mean	Rank	Superintendent Competency or Attribute Required for Success	Mean
1	Ability to Plan Ahead	5.80	11	Ability to Work with Different People	5.42
2	Ability to Get Along with Others	5.69	12	Oral Communication Skills	5.42
3	Ability to Schedule Work Activities	5.68	13	Collaboration Ability	5.39
4	Strong Work Ethic	5.62	14	Detailed Knowledge of Construction	5.39
5	Reliable and Responsive	5.61	15	Trust Building	5.32
6	Leadership Skills	5.58	16	Reinforces Behavior in Others	5.31
7	Strong Values and Ethics	5.57	17	Team Building Skills	5.30
8	Understand Construction Materials	5.55	18	Sense of Urgency	5.29
9	Understand Safety Regulations	5.51	19	Listening Skills	5.28
10	Broad Construction Knowledge	5.44	20	Time Management	5.28

Table 11: Superintendent Opinions – Superintendent’s Required Competencies & Attributes

Rank	Superintendent Competency or Attribute Required for Success	Mean	Rank	Superintendent Competency or Attribute Required for Success	Mean
1	Ability to Plan Ahead	5.82	11	Ability to Work with Different People	5.44
2	Ability to Schedule Work Activities	5.70	12	Broad Construction Knowledge	5.40
3	Strong Work Ethic	5.70	13	Trust Building	5.39
4	Ability to Get Along with Others	5.67	14	Reinforces Behavior in Others	5.38
5	Strong Values and Ethics	5.64	15	Team Building Skills	5.36
6	Leadership Skills	5.62	16	Listening Skills	5.36
7	Reliable and Responsive	5.62	17	Time Management	5.34
8	Understand Safety Regulations	5.59	18	Collaboration Ability	5.33
9	Understand Construction Materials	5.49	19	Detailed Knowledge of Construction	5.32
10	Oral Communication Skills	5.47	20	Ability to Keep Your Cool	5.32

Conclusions and Discussion

One aspect of the results which points to the breadth of competencies and attributes required for a construction superintendent to be successful is that out of the 42 competencies and attributes listed in the survey, 23 received a mean ranking of 5 or above on the 6-point Likert scale. Thirty-three of the 42 competencies and attributes received a mean ranking of 4 or above on the 6-point Likert scale. The item which received the lowest mean ranking was “LEED Accreditation” and it received a 2.9 on the 6-point Likert scale from all participants. This indicates that a superintendent must be multi-talented and very experienced to be successful. Based on the responses from all

participants, 11 out of the top 20 ranked competencies and attributes can be considered people skills. This may indicate a need for more “soft skills” education and training for existing superintendents, foremen and craft personnel moving up toward a superintendent position, and people in postsecondary construction education programs.

Manuscript length restrictions will not allow the inclusion of tables reporting the superintendent competencies or attributes as identified by individuals working in the following sectors of the construction industry: Commercial, Industrial, Heavy Civil, Mechanical, Electrical, Drywall & Framing, Multi-Family Residential, Single-Family Residential, and individuals working for Construction Management Agency firms.

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