MEASURING THE EFFECTIVENESS OF COMPETENCY MODELS FOR JOB-SPECIFIC PROFESSIONAL DEVELOPMENT OF ENGINEERS & ENGINEERING TECHNICIANS

AUTHORS: Dr. Christopher Ahmadjian, PI; Dr. Michael Knodler; Dr. Cole Fitzpatrick, Alyssa Ryan, Chelsea Bouchard

REPORT 14-1

ABSTRACT

Motivation:

As many in the transportation workforce approach retirement and the industry transitions into the 21st century, there are two notable challenges: 1) the incredible wealth of institutional knowledge that will be leaving the workforce, and 2) the continued increase in the application of new technologies, skills, and knowledge of the entering workforce. A resulting impact of these issues is that the gap between old and new employee competencies and skills is widening.

Methods:

All job specifications and postings for all civil engineering levels at New England DOTs were analyzed for competencies based on two accepted competency models in the field. Interviews were conducted to gain the DOT HR perspective.

Results:

There exist notable gaps in competencies and licensure requirements between DOT civil engineer position levels. This research provides a foundation from which to develop competencies for civil engineering positions that is reflective of a more dynamic and sustainable transportation workforce that will excel throughout the 21st century.

ACKNOWLEDGMENTS

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DATA & ANALYSIS

Competency Models Chosen for Analysis

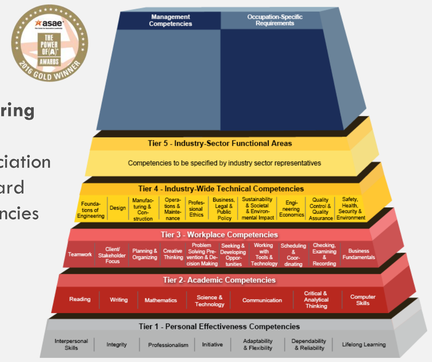
Bureau of Labor Statistics (BLS) Model

- Claims all civil engineers should have core competencies, regardless of level
- Seventeen core competencies

i.e. decision making, leadership, organization, writing, etc.

American Association of Engineering Societies (AAES)

- 2016 American Society of Association Executives Power of A Gold Award
- Tier ranking system for competencies depending on level of positionv



Job Postings and Specifications

- Gathered all for New England DOT civil engineering levels
- Searched for key words to determine if model competencies were included in specific posting/specification

Coordinates data acquisition from other departmental databases for use in the Pavement Management System.

Imports data, documents operating procedures, and generates reports and maps from the Pavement Management System for the Department.

Develops and evaluates engineering models for use in the Pavement Management System.

Prepares pavement data related support to the Department's asset management efforts.

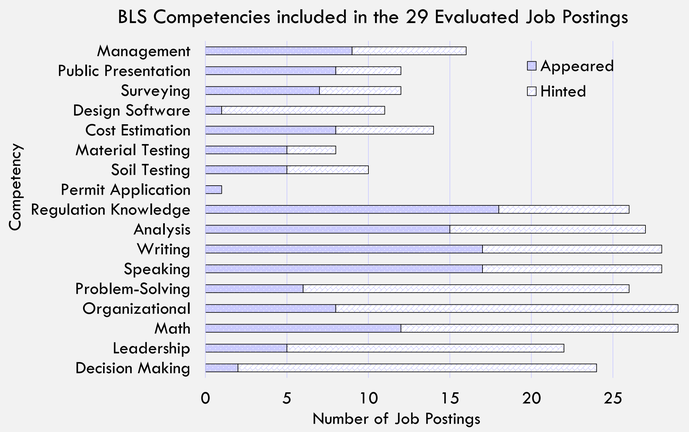
Attends and represents the Department in regional conferences relating to pavement management.

Prepares pavement structural designs, including base courses.

Performs quality control reviews on field data being gathered and maintains the Departments Data Quality Management Plan.

RESULTS

- Job specifications are often include more competencies than postings
- Certain BLS core competencies are more often stated in job postings
- Significant difference in EIT and PE licensure requirements between New England DOTs



Comparison of Job Certification Requirements

		EIT Required	PE Required
CT	I		
	II		
MA	I		
	II	x*	
	III	x*	
	IV	x*	
	V	x*	
	VI	x*	
ME	Assistant Engineer	x**	
	II	x	x
	III	x	x
NH	I		
	II		
	III	x	
	IV	x	x
	V	x	x
	VI	x	x
	VII	x	x

		EIT Required	PE Required
RI	CE		
	CE Associate	N/A	N/A
	CE Senior	x	
	CE Principal	x	
VT	I		
	II		
	III		
	IV		
	V		
	VI		
	VII		
	VIII		

*EIT or PE licensure are not required if applicant is already a MassDOT employee and has adequate experience.
**Only non-engineering college graduate and non-degreed candidates are required to have EIT licensure.
***EIT licensure not required if applicant is willing to accept pay at one-salary grade reduction.

CONCLUSIONS

- Competency models provide a structure to measure performance and offer a more efficient hiring process
- Several gaps (intentional or otherwise) in competencies exist, even in the highest level civil engineering position at a single DOT
- Each CE-specific competency models for state DOT CE positions should be formed around each DOT's strategic goals and objectives
  - Recommended that agencies develop the necessary developmental programs and guidelines to verify that their civil engineering employees are able to acquire the competencies needed for the next job level before obtaining the title
- The interview process revealed many DOTs are struggling with similar issues, such as competing with the private sector
  - A competency model platform would be helpful according to DOT personnel, as they change their old specifications or update their posting process in the future