

Development of an Operational Excellence Model to Improve Safety for Construction Organizations

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Research Question

- Can a sustainable step change in safety performance be achieved through an enhanced culture of rigorous operational discipline, also known as performance excellence?
 - How and what key elements are required to produce the improved safety performance?

RT 317 - Safety Performance through Operational Excellence

Research Phases

Years
1 & 2

- Develop Operational Excellence Model
- Conceptually validate the model



Completed

Years
3 & 4

- Identify relationship between OE adherence and safety performance

In Progress

Objectives for Phases 1

- Define Operational Excellence (OE) in the context of construction project safety
- Develop a model framework for OE
- Create model structure
- Formulate model within the research team
- Validate model with subject matter experts



Define OE

Develop
framework

Create
model

Formulate
model

Validate
model



Define OE

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model

Formulate
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Definition

Operational Excellence

Doing the Right thing, the Right way, Every time, even when no one is watching

Défine OE

Develop
framework

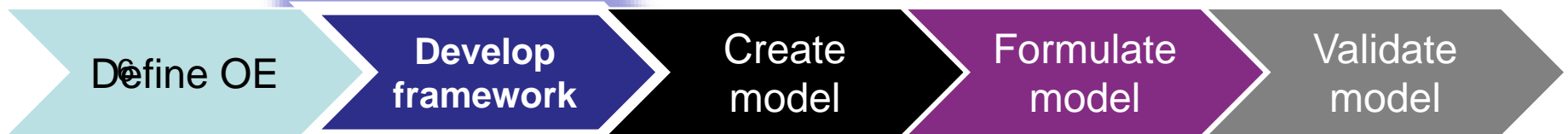
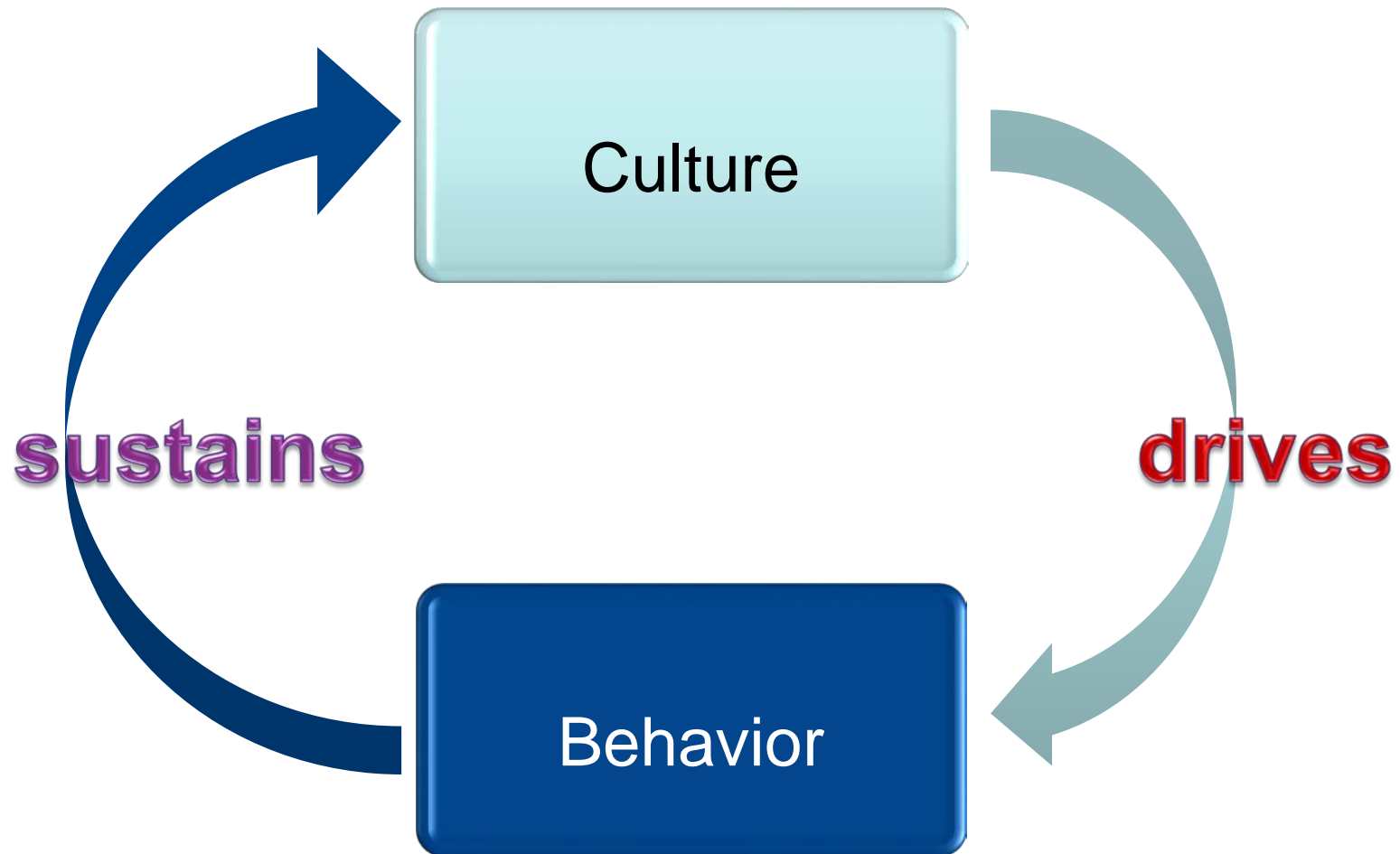
Create
model

Formulate
model

Validate
model

Sustained Improvement through Behavior and Culture

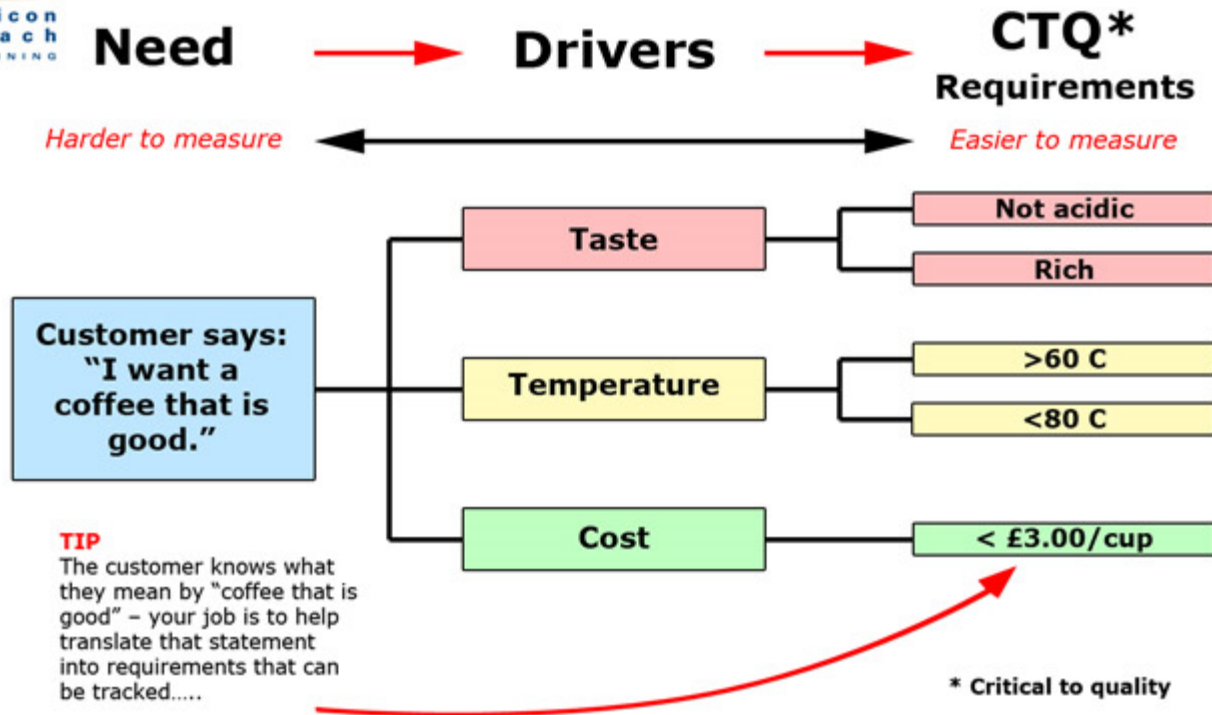
DeJoy Model



How do you quantify an excellent cup of coffee?



Customer Requirements Tree



Define OE

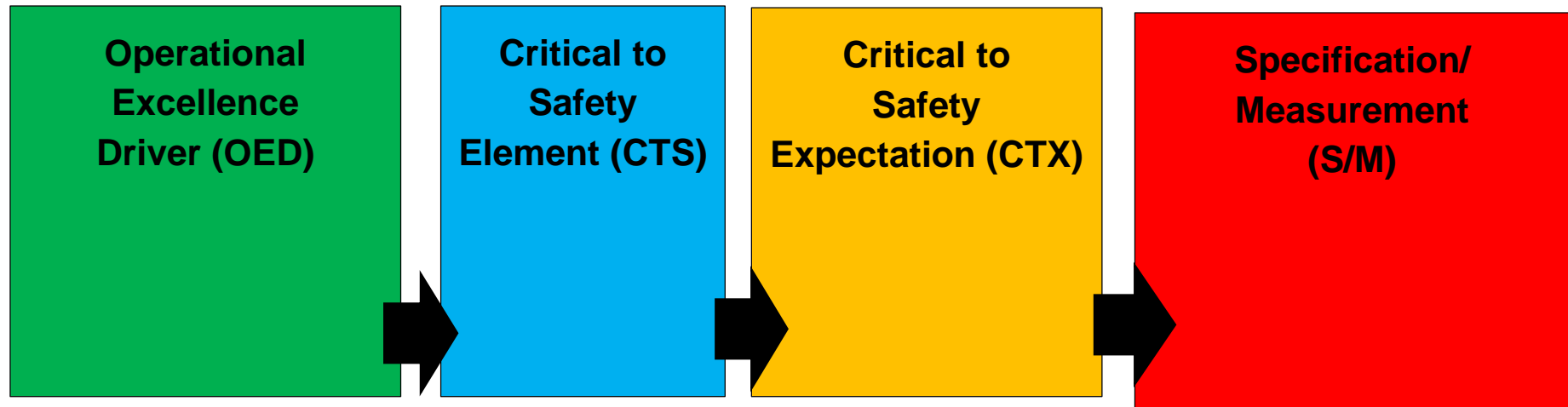
Develop
framework

Create
model

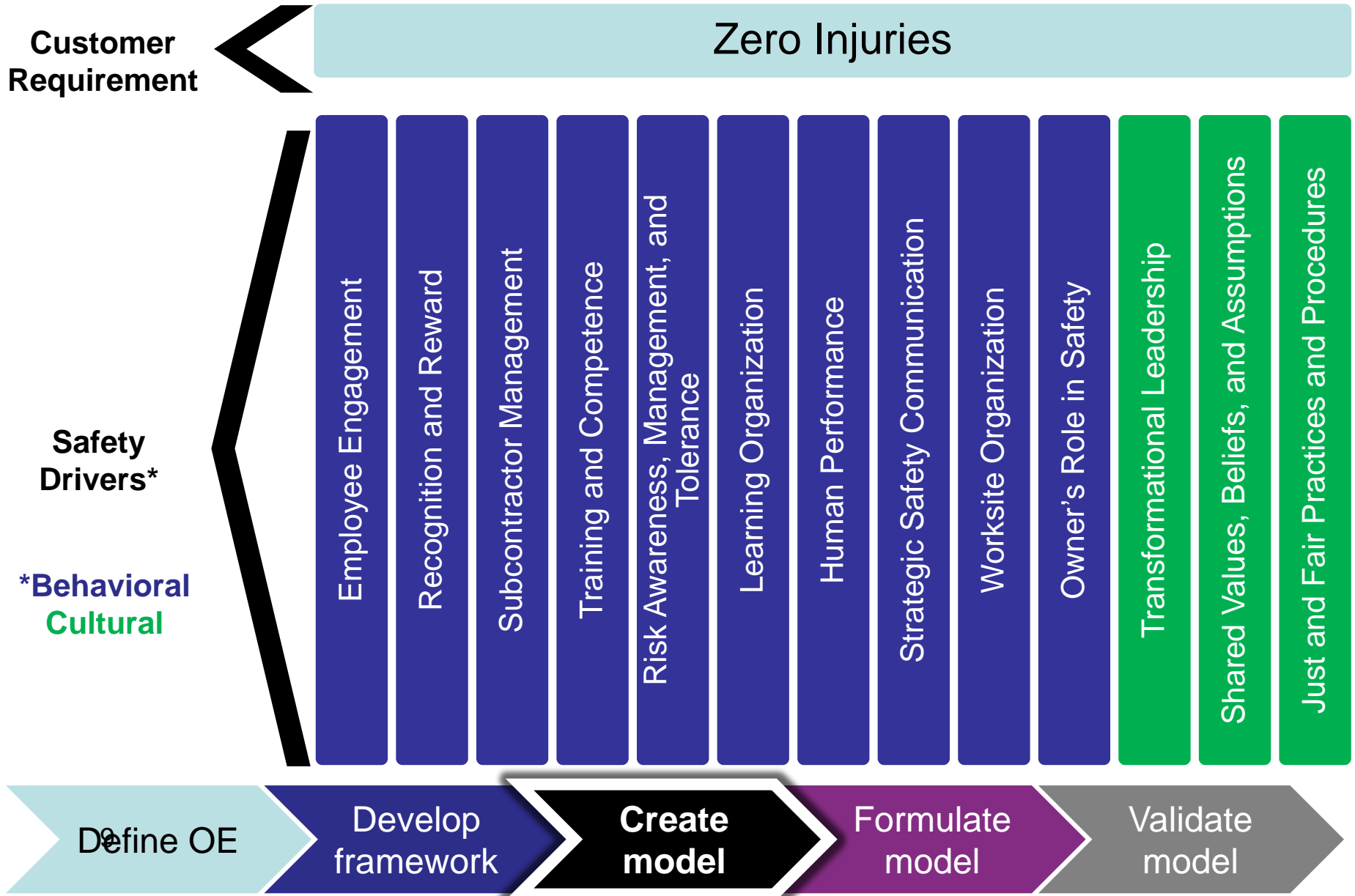
Formulate
model

Validate
model

RT 317's Operational Excellence Model Framework

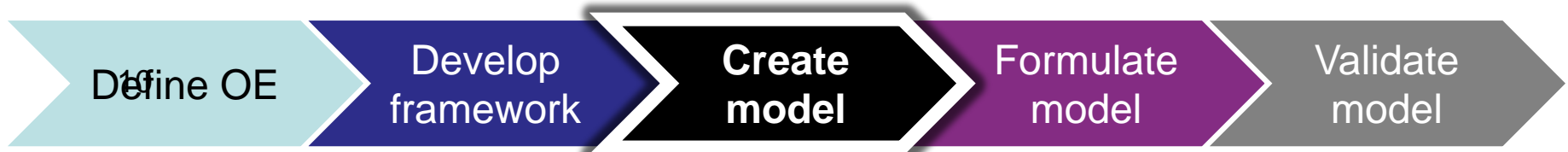


RT 317 OE Model



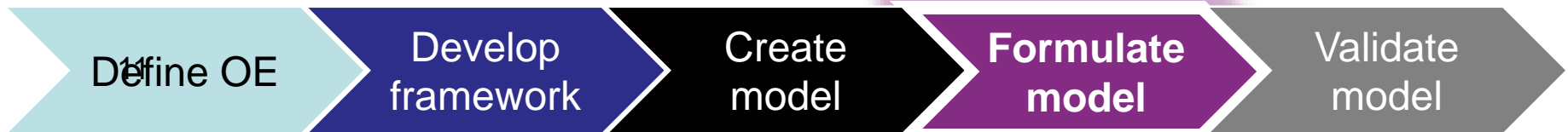
Significant Information Sources

- DuPont – series of publications on operational discipline
- Zurich - Management Safety Culture Assessment
- CII's Owner's Role in Safety, Leadership, and Subcontractor Management literature
- CURT Owner's Safety Blueprint, Contractor Safety Prequalification, Improving Safety Programs, Managing Safety Performance
- Institute of Nuclear Power Operations
- Toyota Production System



Formulation of the Model

- Internal formulation
 - The team reviewed and edited the model through 4 face to face meetings and 4 web meetings
- External formulation
 - The PIs discussed the model with CURT's safety committee on several occasions
 - Portions of the model were reviewed by subject matter experts in the area
 - Charlie Soczek and Brian Rains, DuPont
 - Richard Boutwell, PhD, Consultant to DuPont
 - Dominic Cooper, PhD., Consultant on Safety Culture
 - Chris Garrabrant, PhD., Zurich



Peer Validation Process

- Sent out survey to CII and CURT member companies
- Survey focused on validating the inclusion of the safety drivers and CTSs
 - How important is each safety driver and CTS?
 - 80% agreed or strongly agreed and >3.5 were kept in the model

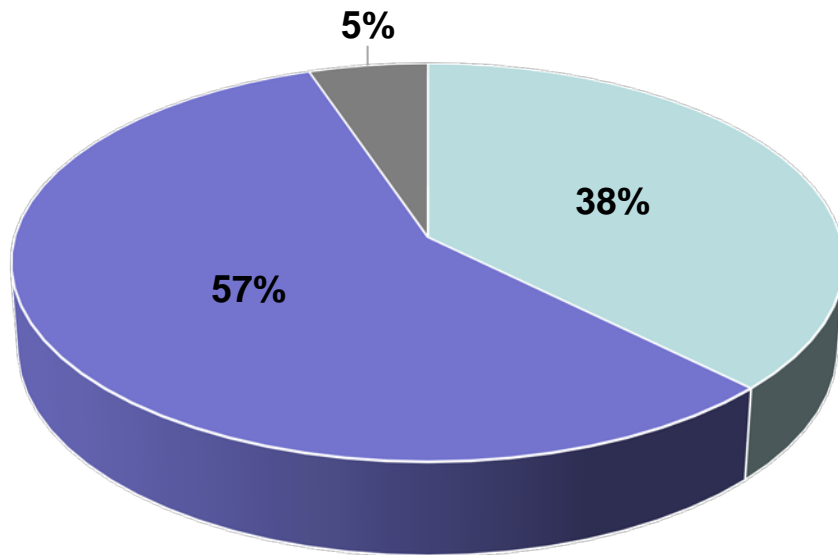
39. How Important is Site safety orientation to developing and understanding of the “Subcontractor Management” driver.

- | | | |
|---|---|-------|
| <input type="checkbox"/> No importance, should be dropped | 1 | |
| <input type="checkbox"/> Little importance | 2 | |
| <input type="checkbox"/> Some importance | 3 | ← 3.5 |
| <input type="checkbox"/> Moderate importance | 4 | |
| <input type="checkbox"/> Great importance | 5 | |



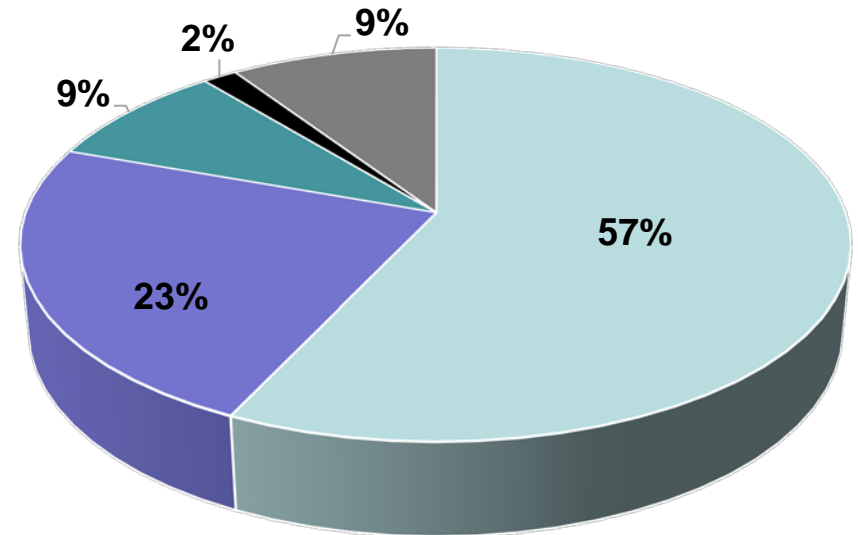
Survey Demographics

Respondent Mix



■ Owner ■ Contractor
■ Other

Respondents by Construction Sector



■ Industrial ■ Commercial
■ Infrastructure ■ Residential
■ Other



Survey Results

- 92 individuals completed at least a portion of the survey
 - 3 CTSs met the elimination criteria
 - Additional comments were supportive of the effort

“Leadership importance cannot be overstated”

“Plan your work and work your plan...or plan to fail”

“Safety is not just a culture, it is a way of life”

“Coaching is the key component of improving safety culture”

“Collectively all of these adds to the culture of safety”



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Define OE

Develop
framework

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model

Formulate
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Validate
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Final Conceptual Model



Benefits of Model

- Identify what *is* being done and what *is not* being done
 - Identify gaps
- Identify what is being done informally and what is being done formally
- Identify how well a process is being performed
- Identify areas of opportunity for improvement

Model Outcomes

- Develops the **gold standard** for Operational Excellence in construction project safety
 - Identifies those processes that must be undertaken to achieve operational excellence in construction safety
 - Identifies the elements of each of those processes
 - Assesses the extent to which each of the elements is performed
- Supports the culture change necessary to drive behavior and decision making in the organization

Next Steps (1/2)

- Conduct a Delphi panel to weight the drivers
 - Expert based iterative process
 - Assigns weights to identify significance
- Review & refine the model based on outcomes of the Delphi panel
- Operationalize the model
 - Converts model from conceptual to functional

Next Steps (2/2)

- Develop self-assessment tool
 - Converts operationalized model to a formal assessment tool
- Collect data on the extent to which firms adhere to the model using organization and project level data
- Identify the relationship between safety performance and adherence to the model as measured by the Operational Excellence index
- Detailed implementation strategies to achieve the gold standard

