From behavior to results: Finding the path to collaborative scheduling success

RT362
From behavior to results: Finding the path to collaborative scheduling success

Research Question:
What are the drivers of and obstacles to the development and implementation of collaborative scheduling?
Collaborative Scheduling is

“A comprehensive process that aligns and engages stakeholders throughout the life cycle of the project in order to coordinate activities and resources and achieve its goal.”

RT362 Team
Survey Respondents

CONTRACTOR 51%
OWNER 28%
ENGINEERING FIRM/CONSULTANCY 16%
OWNER-BUILDER 3%
OTHER 2%
Project Sector Responses

- Upstream, Midstream, and Mining - 10%
- Downstream and Chemicals - 24%
- Power, Utilities, and Infrastructure - 32%
- Manufacturing and Life Sciences - 9%
- Facilities and Healthcare - 25%
## Collaborative Scheduling (CS) Findings & Actions

<table>
<thead>
<tr>
<th>Use Maturity Model to Develop and Implement Collaborative Schedules</th>
<th>Bronze, Silver, and Gold Levels</th>
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<tbody>
<tr>
<td>Identify opportunities for improvement based on:</td>
<td>Key Performance Indicators (KPIs)</td>
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<tr>
<td></td>
<td>Actions to improve the CS process</td>
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<tr>
<td>Propose recommendations</td>
<td>Current best practices on CS</td>
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Research Method

CII Funded Studies Committee

Focus groups discussions with RT-362

RFP Essential Questions

Affinity Diagrams

Maturity Model

Five pillars
Three levels

Statistics Analyses
Information Theory

Qualitative Analyses
with NVivo

Cross Analysis
Survey
Interviews

Literature Review

Recommendations

Timeline
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?
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- **Answer 1**
- **Answer 2**
- **Answer 4**

**Involving all stakeholders**
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

Involving all stakeholders

ANSWER 1

ANSWER 2

Involving all stakeholders

ANSWER 4
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

- Alignment with owner’s expectations
  - Answer 2
  - 53

- Involving all stakeholders
  - Answer 4
  - 14
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

**Alignment with owner’s expectations**

**Involving all stakeholders**

**Answer 2**

**Answer 4**
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

- Alignment with owner’s expectations: 53
- Involving all stakeholders: 14

Answer 4
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

- Alignment with owner’s expectations
  - 53

- Involving all stakeholders
  - 14

Answer 2

Answer 4
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

- Alignment with owner’s expectations: 53
- Schedule visible across project: 27
- Involving all stakeholders: 14
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

- **Alignment with owner’s expectations**: 53
- **Schedule visible across project**: 27
- **Involving all stakeholders**: 14

**Answer 4**
Q1) What does collaborative scheduling mean to your team? What practices are you looking for?

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<td>Schedule visible across project</td>
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<td>Involving all stakeholders</td>
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<tr>
<td>Schedulers and Planners work together</td>
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Collaborative Scheduling

“A comprehensive process that aligns and engages stakeholders throughout the life cycle of the project in order to coordinate activities and resources and achieve its goal.”
CII Best Practices for Collaborative Scheduling Include:

- Team Building
- Front End Planning
- Advanced Work Packaging
- Lessons Learned
- Disputes Resolution and Prevention
Collaborative Scheduling

Pillars

1. Scheduling Significance
   - Creation
   - Culture
   - Visibility
   - Stakeholders
   - Accuracy
   - Adaptability

2. Planners and Schedulers
   - Job Role
   - Cross-Discipline Interactions
   - Understanding
   - Planning Mindset

3. Scheduling Representation
   - Control Metrics
   - Agility
   - Tools and Methods
   - Level of Detail
   - Quality Checks

4. Goal Alignment with Owner
   - Alignment
   - Interactions
   - Expectations

5. Communication
   - Communication Plan
   - Channels
   - Engagement
   - Coordination
   - Psychological Safety
Collaborative Scheduling

**Pillars**

- Scheduling Significance
  - Creation
  - Culture
  - Visibility
  - Stakeholders
  - Accuracy
  - Adaptability

- Planners and Schedulers
  - Job Role
  - Cross-Discipline Interactions
  - Understanding
  - Planning Mindset

- Scheduling Representation
  - Control Metrics
  - Agility
  - Tools and Methods
  - Level of Detail
  - Quality Checks

- Goal Alignment with Owner
  - Alignment
  - Interactions
  - Expectations

- Communication
  - Communication Plan
  - Channels
  - Engagement
  - Coordination
  - Psychological Safety
# Maturity Model – Weight-based Analysis

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### Scheduling Representation
- **Control Metrics**: 80
- **Agility**: 85
- **Tools and Methods**: 95
- **Level of Detail**: 100
- **Quality Checks**: 90

### Goal Alignment with Owner
- **Alignment**: 90
- **Expectations**: 100

### Communication
- **Channels**: 50
- **Engagement**: 90
- **Coordination**: 60
- **Psychological Safety**: 85
Q2) Which CS practices have the highest impact on project KPIs?

| ANSWER 1 | ANSWER 2 | ANSWER 3 | ANSWER 4 | ANSWER 5 | ANSWER 6 | ANSWER 7 | ANSWER 8 |
Q2) Which CS practices have the highest impact on project KPIs?

ANSWER 5

Incorporate planner mindset

ANSWER 8
Q2) Which CS practices have the highest impact on project KPIs?

Incorporate planner mindset

[11]
Q2) Which CS practices have the highest impact on project KPIs?

- **Answer 1**: Project culture 14
- **Answer 3**: Incorporate planner mindset 11
Q2) Which CS practices have the highest impact on project KPIs?

**Answer 1**
Project culture

**Answer 3**

**Answer 4**

**Answer 5**

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**Answer 8**
Q2) Which CS practices have the highest impact on project KPIs?

**Answer 1**
- Project culture
- Effective communication plan

**Answer 5**
- Incorporate planner mindset

**Answer 6**
- 

**Answer 8**
- 

**Answer 4**
- 

**Answer 1**

Score: 14

**Answer 2**

Score: 13

**Answer 3**

Score: 11
Q2) Which CS practices have the highest impact on project KPIs?

**Answer 1:**
- Project culture
- Effective communication plan

**Answer 5:**
- Incorporate planner mindset

**Answer 4:**

**Answer 8:**
Q2) Which CS practices have the highest impact on project KPIs?

**Answer 1**
- Project culture: 14
- Effective communication plan: 13
- Sufficient stakeholder interaction: 12

**Answer 5**
- Incorporate planner mindset: 11

**Answer 6**

**Answer 8**
Q2) Which CS practices have the highest impact on project KPIs?

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- Effective communication plan
- Sufficient stakeholder interaction

**Answer 5**
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**Answer 6**

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ANSWER 1
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- Effective communication plan
- Sufficient stakeholder interaction

ANSWER 5
- Corporate planner mindset

ANSWER 6

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**Answer 5**
- Incorporate planner mindset: 11

**Answer 6**
- Schedule visible across project: 9
Q2) Which CS practices have the highest impact on project KPIs?

- Meet owners’ expectation: 18
- Project culture: 14
- Effective communication plan: 13
- Sufficient stakeholder interaction: 12
- Clear communication channels: 12
- Sufficient schedule information sharing: 11
- Incorporate planner mindset: 11
- Schedule visible across project: 9
Impactful Practices on KPIs

- Cost
- Schedule
- Quality
- Safety
- Teamwork
<table>
<thead>
<tr>
<th>Cost</th>
<th>Schedule</th>
<th>Quality</th>
<th>Safety</th>
<th>Teamwork</th>
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<td>Appropriate Agendas for Meetings</td>
<td>Coordination - Collaborative Schedule Updates</td>
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**Key:**
- **Communication:** Effective Communication Plan, Sufficient Communication Channels
- **Coordination:** Sufficient Coordination, Appropriate Agendas for Meetings
- **Engagement:** Sufficient Feedback, Scheduling Significance
- **Visibility:** Visible Across Project
- **Culture:** Project Culture
- **Goal Alignment:** with the Owner
# Impactful Practices KPI Matrix

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### Impactful Practices KPI Matrix

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Collaborative Scheduling

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- Control Metrics
- Alignment
- Agility
- Interactions
- Tools and Methods
- Expectations
- Level of Detail
- Quality Checks
- Communication Plan
- Channels
- Engagement
- Coordination
- Psychological Safety

Collaborative Scheduling

44
Engage the owner in schedule discussions and respect the existing knowledge in the owner’s organization.

Major project stakeholders are required to actively participate in the scheduling process.

Owner’s expectations, including milestones, are known and clearly incorporated during the scheduling process.

All voices are heard, needs and concerns incorporated.
Schedule Representation

- Have the **project schedule** used within the project support strong project **culture based on accountability, timeliness, and collaboration**.
- The **schedule** should be **visible to everyone** in the project.
- Use **Pull Planning sessions** to **engage participants** and promote **participation in the scheduling tasks**.
- Validate schedules with **input from subcontractors**.
Communication

✓ Have **regular meetings** and good meeting **attendance**

✓ **Ensure effective communication** between shifts and crews (RT-185)

✓ **Use processes to facilitate Collaboration & Integration (CI) of teams** (RT-341)

✓ **Define clear communication channels** between contractors’ schedulers and owner’s schedulers

✓ **Define a clear communication mechanism throughout** project (RT-310 & RT-341)
Q3: What CS practices impact teamwork the most?

**Answer 1**

**Answer 2**

**Answer 3**

**Answer 4**

**Answer 5**
Q3: What CS practices impact teamwork the most?

Project Culture

ANSWER 2

ANSWER 3

ANSWER 4

ANSWER 5
Q3: What CS practices impact teamwork the most?

- Project Culture
- Collaborative Schedule
- Updates
- Appropriate agendas for Meetings
- Clear Communication Channels
- Effective Communication Plan
Q3: What CS practices impact teamwork the most?

- Project Culture: 23
- Clear Communication Channels: 22
- Answer 2
- Answer 4
- Answer 5
Q3: What CS practices impact teamwork the most?

- Project Culture: 23
- CLEAR COMMUNICATION CHANNELS: 22
- ANSWER 2
- ANSWER 4
- ANSWER 5
Q3: What CS practices impact teamwork the most?

- Project Culture
- Collaborative Schedule
- Updates
- Appropriate agendas for Meetings
- Clear Communication Channels

Answer 2: Clear Communication Channels

Answer 4:

Answer 5:
Q3: What CS practices impact teamwork the most?

- Project Culture: 23
- Clear Communication Channels: 22

ANSWER 2

ANSWER 4

ANSWER 5
Q3: What CS practices impact teamwork the most?

- **Project Culture**: 23
- **Collaborative Schedule Updates**: 18
- **Clear Communication Channels**: 22
Q3: What CS practices impact teamwork the most?

- Project Culture: 23
- Effective Communication Plan: 22
- Clear Communication Channels: 22
- Collaborative Schedule Updates: 18
- Appropriate agendas for Meetings: 15
Schedule Significance

- Have the **project schedule** used within the project support strong project **culture** based on **accountability, timeliness, and collaboration**
- The **schedule** should be **visible** to everyone in the project
- **Implement** the **schedule** as a **culture** not a tool
- **Respect** the different comfort levels of **each partner** and break the culture of “bullying” contractors
Define a clear communication mechanism throughout the project to facilitate Collaboration & Integration (CI) of teams. (RT-310, RT-341)

Define clear communication channels between contractors’ schedulers and owner’s schedulers.

Have regular meetings and promote good meeting attendance to work on schedule updates.

Ensure effective communication between shifts and crews (RT-185)
✓ Promote a "planner mindset" so that the team is actively engaged, timely, and forward-looking regarding schedule issues
Q4 What techniques and methods are used to represent and communicate the schedules?
Q4 What techniques and methods are used to represent and communicate the schedules?
Q4 What techniques and methods are used to represent and communicate the schedules?

ANSWER 1

ANSWER 2

ANSWER 3

ANSWER 4
Q4 What techniques and methods are used to represent and communicate the schedules?

**ANSWER 1**

**ANSWER 2**

Pull Planning 18

**ANSWER 4**
Q4 What techniques and methods are used to represent and communicate the schedules?

**Answer 1**

**Answer 2**

Pull Planning

**Answer 4**
Q4 What techniques and methods are used to represent and communicate the schedules?

- **Last Planner® System**: 40
- **Pull Planning**: 18
Q4 What techniques and methods are used to represent and communicate the schedules?

- Last Planner® System
- Pull Planning
- Answer 2
- Answer 4
Q4 What techniques and methods are used to represent and communicate the schedules?

- **Last Planner® System**: 40
- **Advanced Work Packaging (AWP)**: 23
- **Pull Planning**: 18

**ANSWER 4**
Q4 What techniques and methods are used to represent and communicate the schedules?

- **Last Planner® System**
  - 40
- **Advanced Work Packaging (AWP)**
  - 23
- **Pull Planning**
  - 18
Q4 What techniques and methods are used to represent and communicate the schedules?

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<td>Advanced Work Packaging (AWP)</td>
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<td>18</td>
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<td>Critical Path Method Scheduling</td>
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</table>
The Last Planner® System – connect the project master schedule and the management of production crews via reliable promises

Advanced Work Packaging - preliminary planning, detailed engineering, and construction (RT-272)

Structure Advanced Work Packages by disciplines and involve participants early in the project (RT-319)

CPM Scheduling – overall project schedule and project controls
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

Effective Communication Plan
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

Answer 1

Answer 2

Answer 3

Effective Communication Plan
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

**Answer 1**
Sufficient Stakeholder Interaction

**Answer 3**
Effective Communication Plan

24
16
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

**Answer 1**
Sufficient Stakeholder Interaction

**Answer 3**
Effective Communication Plan
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

- Meet Owner’s Expectations: 37
- Sufficient Stakeholder Interaction: 24

**Answer 3**

- Effective Communication Plan: 16
Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

- Meet Owner’s Expectations: 37
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Q5: With COVID-19 in mind, what CS practices impact cost and schedule the most?

- Meet Owner’s Expectations: 37
- Sufficient Stakeholder Interaction: 24
- Schedule Visible across Project: 23
- Effective Communication Plan: 16
Impact on Cost and Schedule KPIs

- Owner's expectations are met throughout the whole project life cycle
- Assure sufficient and consistent interaction between project stakeholders
  - Schedule is visible across the entire project team
  - The project has an effective communication plan
Q6: Which roadblocks can be removed to promote collaborative scheduling?
Q6: Which roadblocks can be removed to promote collaborative scheduling?

- **Answer 1**
- **Answer 2**
- **Answer 3**
- **Answer 4**
- **Answer 5**
- **Answer 6**
Q6: Which roadblocks can be removed to promote collaborative scheduling?
Q6: Which roadblocks can be removed to promote collaborative scheduling?

- **Answer 1**
- **Answer 2**
- **Answer 3**
- **Answer 4**
- **Answer 5**
- **Answer 6**

Selected answer: **Contractual practices**
Q6: Which roadblocks can be removed to promote collaborative scheduling?

- Poor communication protocols
- Contractual practices
Q6: Which roadblocks can be removed to promote collaborative scheduling?

**Answer 1:** Poor communication protocols

**Answer 3:**

**Answer 4:** Contractual practices

**Answer 6:**
Q6: Which roadblocks can be removed to promote collaborative scheduling?

**Answer 1**
- Poor communication protocols

**Answer 2**
- People-related issues

**Answer 3**
- Contractual practices

**Answer 6**
Q6: Which roadblocks can be removed to promote collaborative scheduling?

**ANSWER 1**
- People-related issues
- Poor communication protocols

**ANSWER 2**
- Contractual practices

**ANSWER 3**
Q6: Which roadblocks can be removed to promote collaborative scheduling?

**Answer 1**
- Poor communication protocols (9)
- Contractual practices (4)

**Answer 2**
- People-related issues

**Answer 3**
- 

**Answer 6**
- 

**Answer 1**
- Poor communication protocols (9)
- Contractual practices (4)
Q6: Which roadblocks can be removed to promote collaborative scheduling?

**Answer 1**
Poor communication protocols

**Answer 3**

**Answer 6**

- People-related issues: 9
- Contractual practices: 4
Q6: Which roadblocks can be removed to promote collaborative scheduling?

**ANSWER 1**
- People-related issues (9)
- Contractual practices (4)

**ANSWER 2**
- Poor communication protocols (11)

**ANSWER 3**
- Lack of Training (3)
Q6: Which roadblocks can be removed to promote collaborative scheduling?

<table>
<thead>
<tr>
<th>Roadblock</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Culture</td>
<td>14</td>
</tr>
<tr>
<td>People-related issues</td>
<td>9</td>
</tr>
<tr>
<td>Poor communication protocols</td>
<td>11</td>
</tr>
<tr>
<td>Contractual practices</td>
<td>4</td>
</tr>
<tr>
<td>Misalignment</td>
<td>10</td>
</tr>
<tr>
<td>Lack of Training</td>
<td>3</td>
</tr>
</tbody>
</table>
Alignment & Communication

- **Eliminate misalignment** during buy out stage by reconciling different stakeholders’ goals *(RT-341)*
- **Implement continuous communication** and issue resolution process *(RT-341)*
- **Have consistency in reporting** *(RT-341)*
Contracts & Culture

✓ **Define demands, roles, and responsibilities** regarding the development of collaborative schedules in the contract

✓ **Assign the right people to the right meetings**

✓ **Promote a culture** that encourages people to speak up and share their knowledge

✓ **Have the leadership** of the project set the example of what collaboration looks like
Collaborative Scheduling

Maturity Model
Maturity Model Levels

**Bronze**
Least collaborative
Score: 54 or less

**Silver**
Moderately collaborative
Score: 55 to 76

**Gold**
Most collaborative
Score: 77 or higher

**Aspiring**

**Struggling**

**Capable**
# Maturity Model: Example Recommendations

<table>
<thead>
<tr>
<th></th>
<th>Move to Silver</th>
<th>Move to Gold</th>
<th>Gold+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job Role</strong></td>
<td>Allow the scheduler to be involved and use experience to organize the schedule</td>
<td>Allow the scheduler to facilitate the creation and management of the schedule from inception</td>
<td>Provide the scheduler the autonomy to not only own creation and management of the schedule but also use their role to influence the decision making of others on the Project Team</td>
</tr>
<tr>
<td></td>
<td>in a common-sense manner that makes sense for all parties</td>
<td>to progress updates throughout the life of the project</td>
<td></td>
</tr>
<tr>
<td><strong>Cross-Discipline</strong></td>
<td>Enable and encourage schedulers to work across departments and with other</td>
<td>Reinforce the importance of consistent cross functional access to schedulers, enabling clear communication and scheduling insights from all disciplines</td>
<td>Require specific and regular communications between Project Team members and the scheduler and actively break down silos between functions at a Management level</td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td>stakeholders to shape a schedule that will be more accurate and can be utilized</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>throughout the life of the project</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Understanding</strong></td>
<td>Have defined responsibilities and definitions of planning and scheduling</td>
<td>Engage in planning and scheduling activities unique to each project. Verify that there is a</td>
<td>Contractually require that these terms are aligned on and understood between all interested parties on the Project to ensure these differences are respected</td>
</tr>
<tr>
<td></td>
<td>unique to each company and project</td>
<td>clear difference between Planners and Schedulers, and it is understood by all in schedule creation</td>
<td></td>
</tr>
<tr>
<td><strong>Planning Mindset</strong></td>
<td>Implement processes and identify opportunities that enable proactive behavior</td>
<td>Actively reinforce processes that support a “planning mindset” and constantly engage in</td>
<td>Require project leadership (Managers, Superintendents, etc.) to develop their own plans and regularly align these work plans through formalized workshops or Interactive Planning</td>
</tr>
<tr>
<td></td>
<td>(i.e. workshops, small group discussions, Interactive Planning Sessions)</td>
<td>opportunities supporting collaborative and proactive planning approaches</td>
<td></td>
</tr>
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</table>
# Maturity Model: Example Recommendations

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<td>Enable and encourage schedulers to work across departments and with other stakeholders to shape a schedule that is more accurate and can be utilized throughout the life of the project.</td>
<td>Reinforce the importance of consistent cross functional access to schedulers, enabling clear communication and scheduling insights from all disciplines.</td>
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<td></td>
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</table>

### Planning Mindset

- **Planning Mindset**
  - Implement processes and identify opportunities that enable proactive behavior (i.e. workshops, small group discussions, Interactive Planning Sessions).
Q7: Is there a difference between planners and schedulers?
RT362

Challenges and Opportunities to Promote Collaborative Scheduling

Academic Leads
Thais Alves, San Diego State University
Min Liu, North Carolina State University
Natalie Scala, Towson University

Students
GongFan Chen, North Carolina State University
Dominique Hawkins, Towson University
Chuanni He, North Carolina State University
Vince Schiavone, Towson University
Anup Vedamurthy, San Diego State University

Members
Gary Orton, Bentley Systems
Ryan Altemare, ExxonMobil
Chris Carson, Arcadis U.S., Inc
Austin Krueger, AZCO Inc.
Paul Leahy, Matrix NAC
Tannis Liviniuk, Trillium Advisory Group Ltd
Luis Rangel, Wood
Isaac Reynolds, Eastman Chemical Company
Mark Triesch, ePM, LLC

Vice Chair - Joe Gerweck, DTE Energy
Chair - Felipe Engineer, McCarthy Building Companies, Inc.