



WEBINAR

# Stay Calm and Continue Applying Lean During Covid-19

—  
Cynthia CY Tsao

April 9, 2019 (8:00 AM to 9:30AM) PDT



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**Lean Construction  
Institute - Qatar**  
Transforming the Built Environment



LCI-Qatar is committed to continuing Lean education

**Keep on Learning!**

In collaboration with Lean Construction Blog,  
LCI-Qatar is pleased to facilitate

**Stay Calm and Continue Applying Lean  
During Covid-19**

Webinar Facilitator



Dr. Cynthia C.Y. Tsao  
Owner of Navilean LLC

Date: April 9, 2020 | Time: 6:00 - 7:30PM

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**Leveraging Lean During COVID-19**  
**Tuesday, April 7th | 11:00 am ET | Webinar**



**Cynthia Tsao, Ph.D.**  
**Owner of Navilean, LLC and Founder of Building AEC Learning**

Cynthia Tsao is the Owner of Navilean LLC, a consulting firm that guides companies and project teams in Project Team Alignment, Decision Making Strategy, Design and Delivery Management, Knowledge Management, and Production System Design and Control. She is also the Founder of Building AEC Learning, a non-profit organization that fosters respect and trust amongst companies and project teams through collaborative learning and experimentation.



**CM-LEAN**  
 CERTIFICATE OF  
 MANAGEMENT  
 LEAN CONSTRUCTION

**#ConstructionInCrisis**




**CONSTRUCTION  
 IN CRISIS**

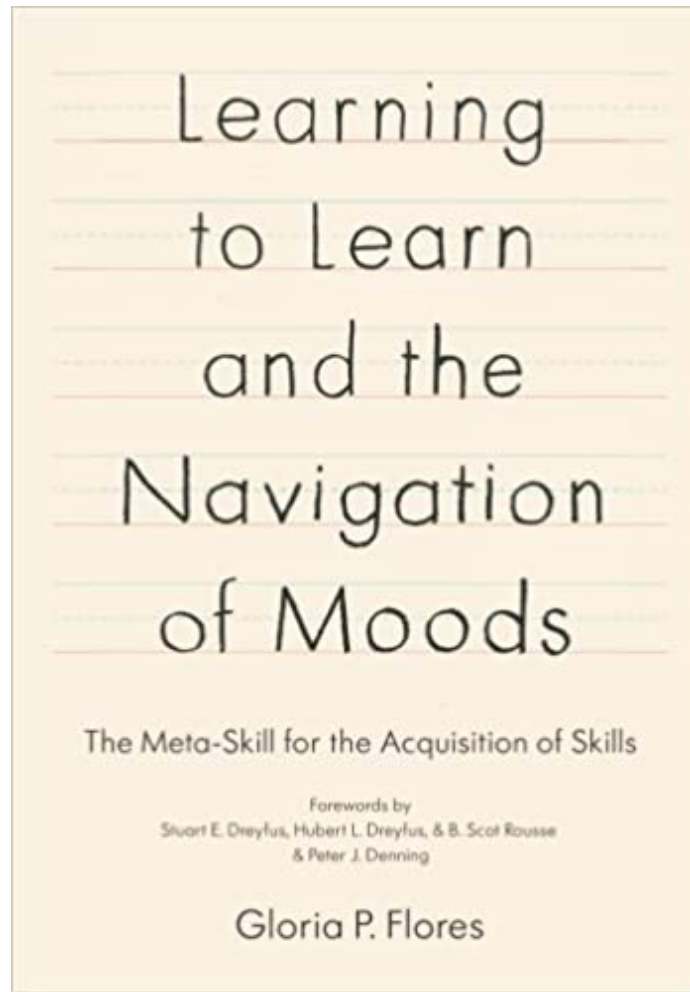
**A CURT  
 Response**

**CURT**



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What is the mood in your **company**?

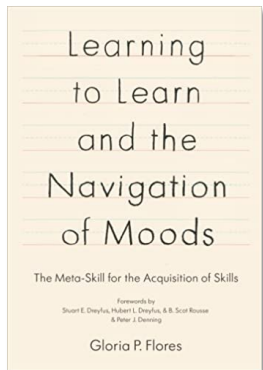
What is the mood of your **project team members** who work primarily in the trailer (PM staff)?

What is the mood of your **project team members** who work primarily on-site (Field staff)?

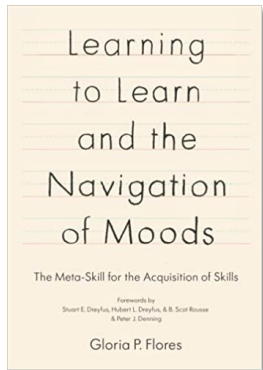
What is the mood of your project's **construction workers**?

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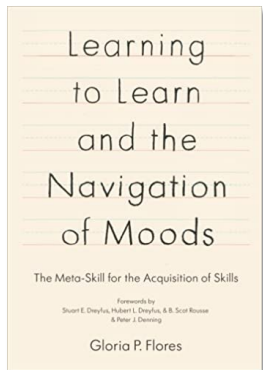


<b>Moods that get in the way of learning</b>	<b>Moods that are conducive to learning</b>
<ul style="list-style-type: none"><li>• Confusion</li><li>• Resignation</li><li>• Frustration</li><li>• Arrogance</li><li>• Impatience</li><li>• Boredom</li><li>• Fear / Anxiety</li><li>• Overwhelm</li><li>• Lack of Confidence (insecurity)</li><li>• Distrust or Skepticism</li></ul>	<ul style="list-style-type: none"><li>• Wonder</li><li>• Perplexity</li><li>• Serenity / Acceptance</li><li>• Patience</li><li>• Ambition</li><li>• Resolution</li><li>• Confidence</li><li>• Trust</li></ul>



## “Quality installed work”

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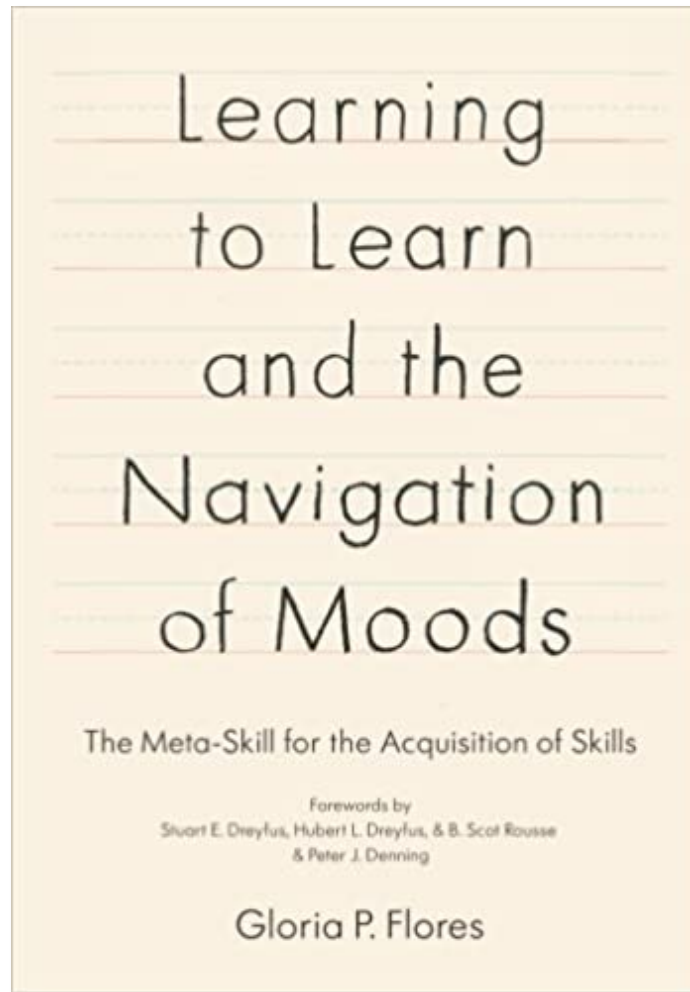
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The **risk** of COVID-19 has introduced these moods

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What is the mood in your **company**?

What is the mood of your **project team members** who work primarily in the trailer (PM staff)?

What is the mood of your **project team members** who work primarily on-site (Field staff)?

What is the mood of your project's **construction workers**?

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wbur

Bostonomix

## 'They're All Just Waiting To Get Sick': Construction Sites Raise Concerns In Coronavirus Pandemic 04:36

🔗 </>

April 03, 2020

By [Callum Borchers](#) 



*“Construction has become a divisive issue in MA during the outbreak. [The governor] classified...real estate development as essential, and says it can continue. But some mayors - including Boston - have ordered most work to halt. **There are risks in keeping going and other risks in stopping. The tension is forcing companies and workers to make some difficult decisions...** But with coronavirus cases in MA continuing to rise, the sanitation stakes are now extra high.”*

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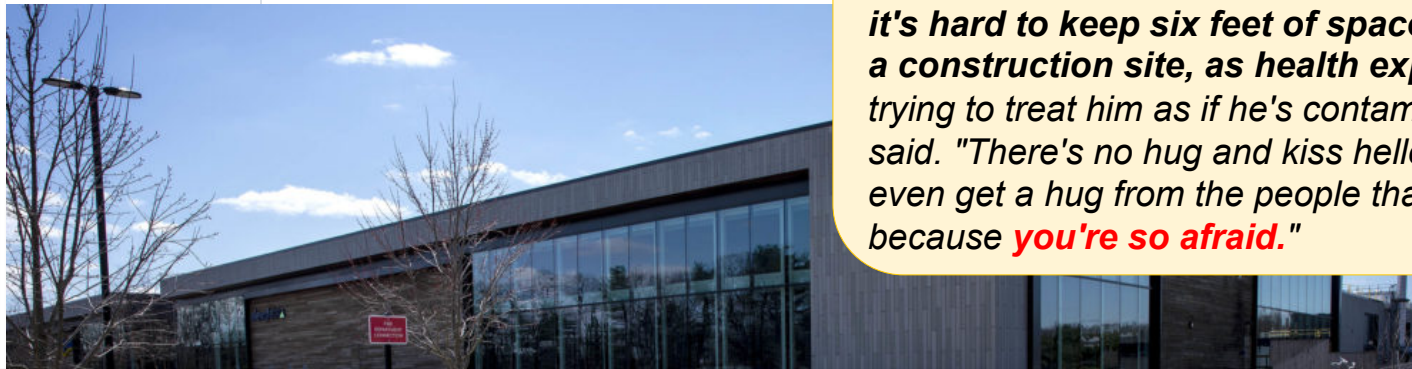
Bostonomix

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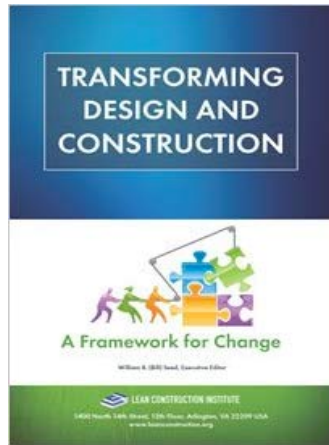


**"My husband is very nervous about bringing illness home,"** said Michelle... Her husband needs to support their family, so he keeps going to work. But Michelle said **it's hard to keep six feet of space between workers on a construction site, as health experts recommend.** "I'm trying to treat him as if he's contaminated all the time," she said. "There's no hug and kiss hello. I mean, you can't even get a hug from the people that you care about because **you're so afraid.**"

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# Primary Lean Principle = RESPECT FOR PEOPLE



Lean Construction Institute's 2015 book  
*Transforming Design & Construction*

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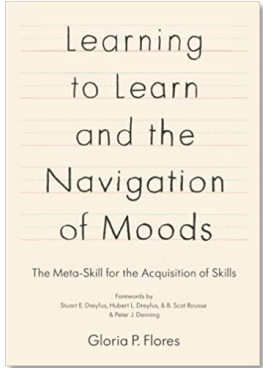
## Primary Lean Principle = **RESPECT FOR PEOPLE**

Construction Project Leaders should **acknowledge** and **respect** the

- **Fear / Anxiety**
- **Overwhelm**
- **Lack of Confidence (insecurity)**

**moods** in your project's workers





# “Quality installed work”

Moods that get in the way of learning	Moods that are conducive to learning
<ul style="list-style-type: none"><li>• Confusion</li><li>• Resignation</li><li>• Frustration</li><li>• Arrogance</li><li>• Impatience</li><li>• Boredom</li><li>• <b>Fear / Anxiety</b></li><li>• <b>Overwhelm</b></li><li>• <b>Lack of Confidence (insecurity)</b></li><li>• Distrust or Skepticism</li></ul>	<ul style="list-style-type: none"><li>• Wonder</li><li>• Perplexity</li><li>• Serenity / Acceptance</li><li>• Patience</li><li>• <b>Ambition</b></li><li>• <b>Resolution</b></li><li>• <b>Confidence</b></li><li>• <b>Trust</b></li></ul>

Transform the **risk** of COVID-19 into an **opportunity**

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**KEEP  
CALM  
AND  
PLAN  
ON**

*LEVERAGE THE COVID-19 DISRUPTION TO  
IMPROVE THE PLANNING ON YOUR PROJECTS!*

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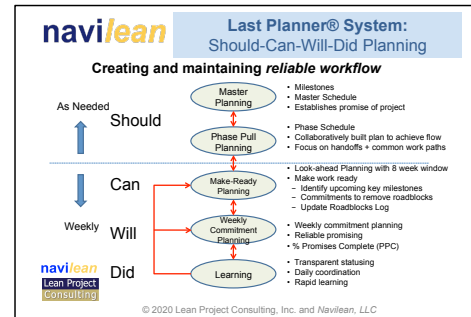
# WORK SHIFTS



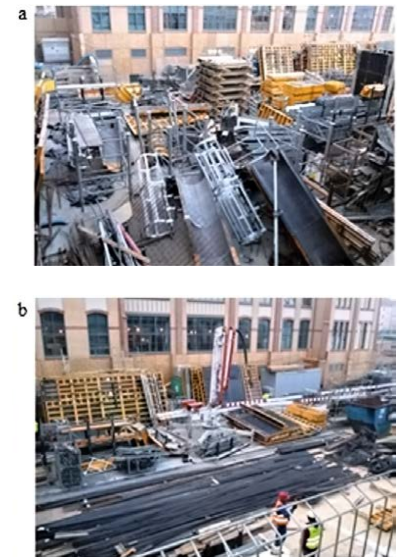
# SUPPLY CHAIN



# LAST PLANNER



# 5S



# WORK SHIFTS

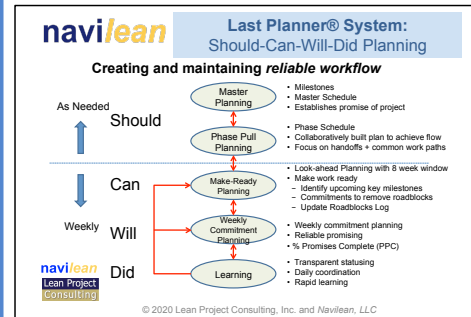


# SUPPLY CHAIN



Future Session?

# LAST PLANNER

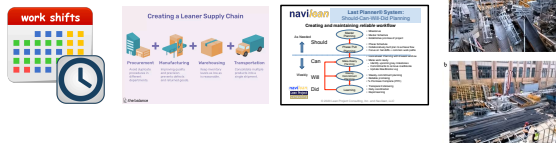


# 5S





WS SC LPS 5S



During the crisis, make your project the “**job site of choice**” by operating with a **36-hour work week** while **paying** for a 40-hour work week

- “Four-Nines”
- “Three-Twelves”

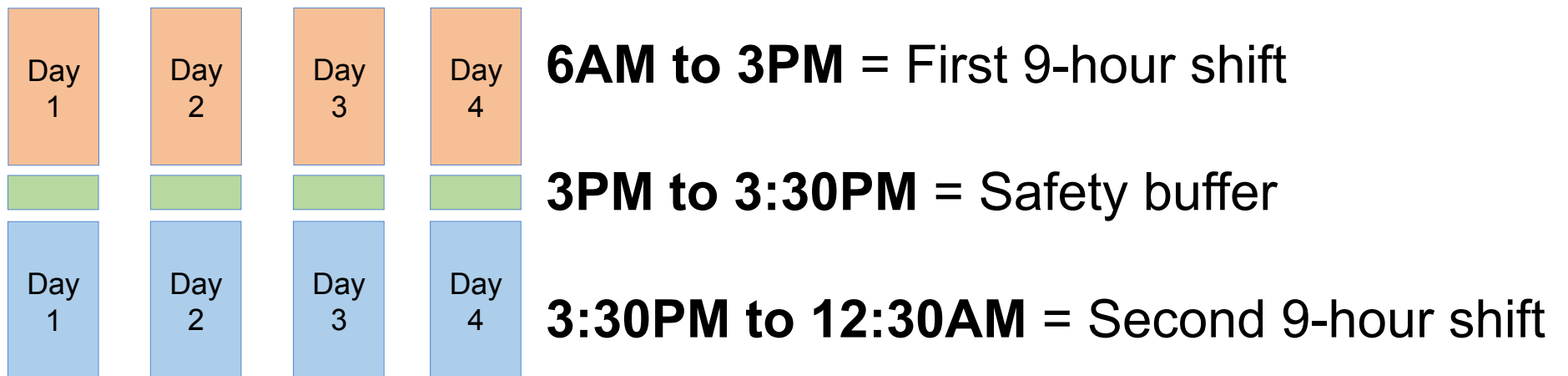
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## “Four-Nines” with 2 Shifts



**72** production hours a week

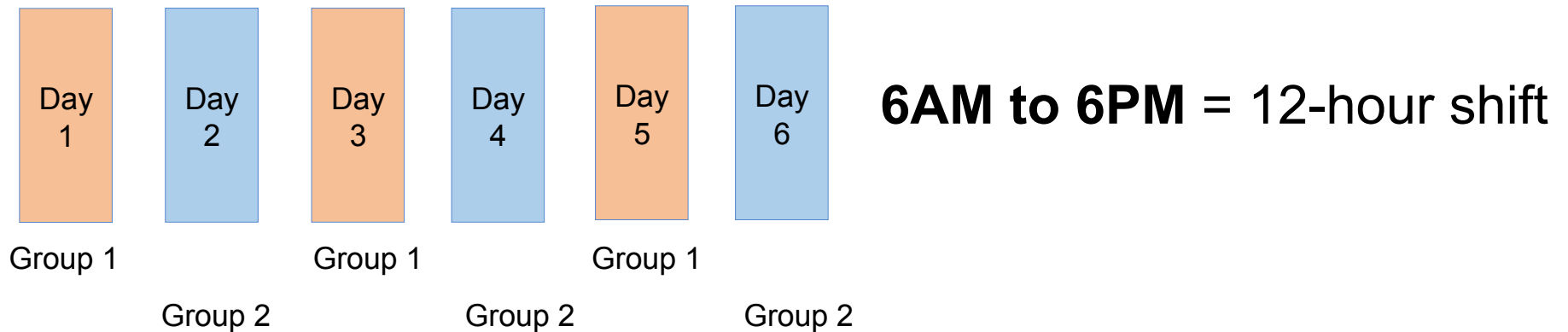
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# “Three-Twelves” with 3 Groups



**72** production hours a week

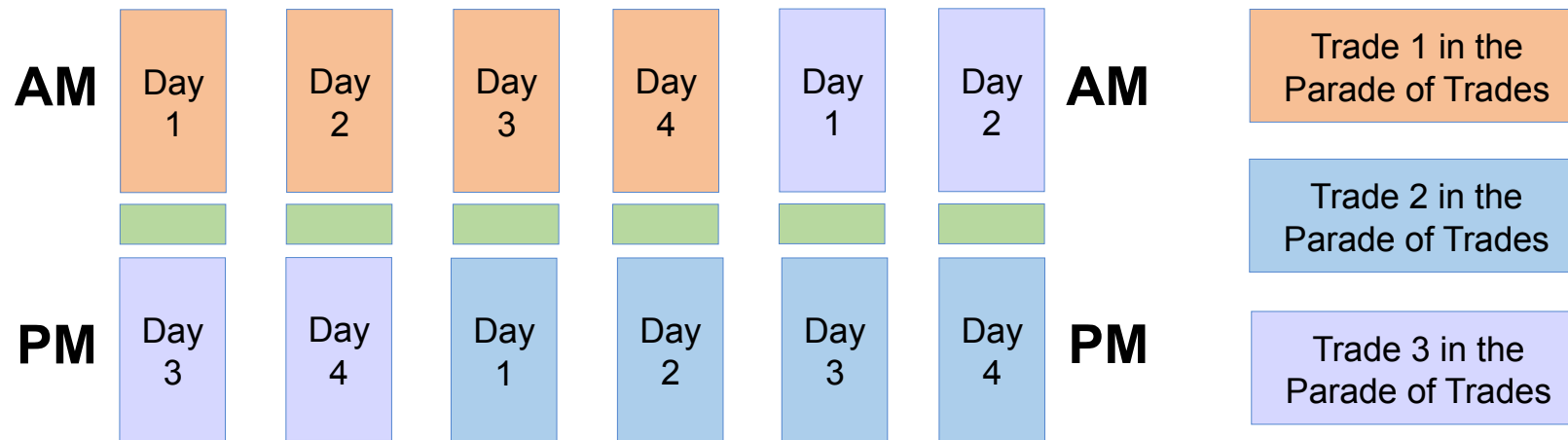
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# “Four-Nines” with 2 Shifts and 3 groups over 6 days



**108** production hours a week

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## **Staggered Start** to avoid the crunch at the start and end of the shift

Trade 1 in the Parade of Trades

**6AM to 2PM = 8-hour shift**

Trade 2 in the Parade of Trades

**6:30AM to 2:30PM = 8-hour shift**

Trade 3 in the Parade of Trades

**7AM to 3PM = 8-hour shift**

**40** production hours a week

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What about checking the temperature of workers to permit entry on-site?

- Hire **on-site nurses**
- Train **security guards**
- Train **safety staff**

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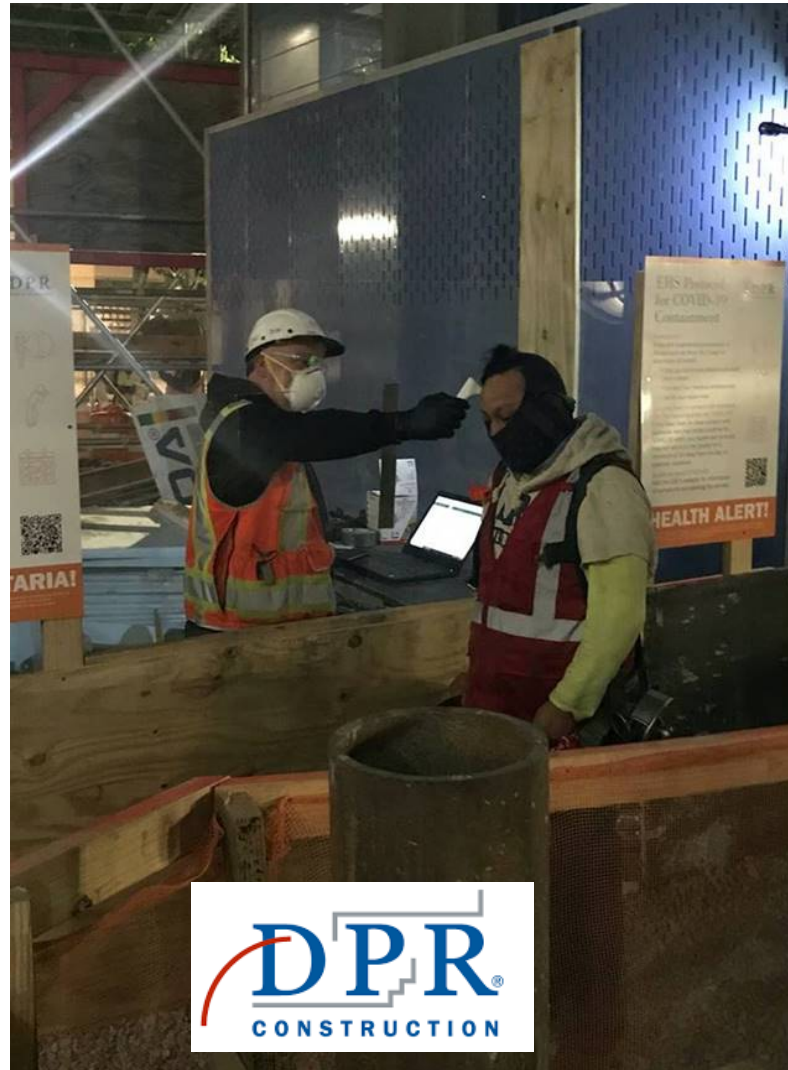
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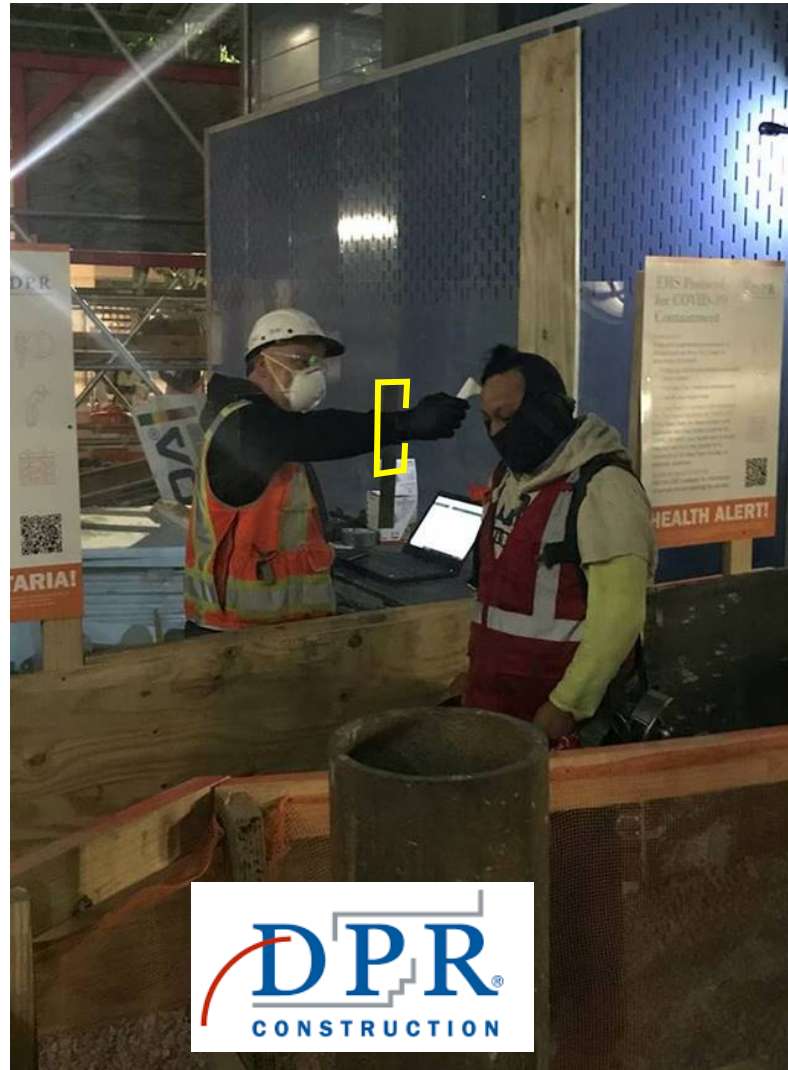


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What about checking the temperature of workers to permit entry on-site?



**CURT's April 2<sup>nd</sup> webinar** shared these thermal camera options:

[Module Yard Thermal body temperature scanner \(HIKVISION\)](#)

[Ten best thermal cameras](#)

[Thermal Imaging – Thermoteknix Systems Ltd](#)

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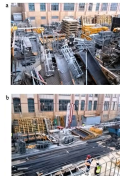
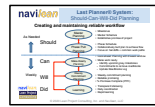
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**WS**   **SC**   **LPS**   **5S**



Ask workers to **respect** the job site by cleaning it daily and keeping it clean

Photos from:

Nowotarski et al. (2016)  
"Improving Construction Processes Using Lean Management Methodologies – Cost Case Study."  
Procedia Engineering

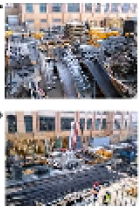


**A clean job site is a productive job site!**

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# 5S



1		<b>SORT</b> Remove all items that are not used or needed in the work area.	<b>"When in doubt, move it out!"</b>
2		<b>SET IN ORDER</b> Find the best location for remaining items, set inventory limits, and place temporary labels, lines and signboards.	<b>"A place for everything and everything in its place!"</b>
3		<b>SHINE</b> Clean, repair, and paint everything, inside and out. Prevent dirt, grime, and contamination from reoccurring. Inspect while cleaning.	<b>"Make it clean and keep it clean"</b>
4		<b>STANDARDIZE</b> Write 5S SWIS for maintaining and controlling the first 3.	<b>"Quality processes on time every time!"</b>
5		<b>SUSTAIN</b> With Management support, use 5S Board, Monthly audits and recognition.	<b>"The most difficult – just do it!"</b>

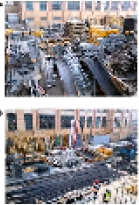
**"Clean as you go!"**

<https://www.mscdirect.com/betterMRO/safety/5s-%E2%80%94-basics-workplace-organization>

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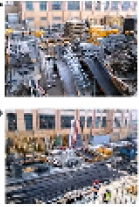
**5S**



## When is there time to clean?

- Shift start = **First 40 minutes**
  - Stretch & Flex + Safety Toolbox Talk
  - **Pre-Task Planning** + Disinfect
- Shift end = **Last 40 minutes**
  - **Reflect** + Disinfect

**5S**



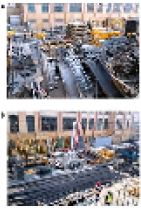
Where can I find **disinfectant**?

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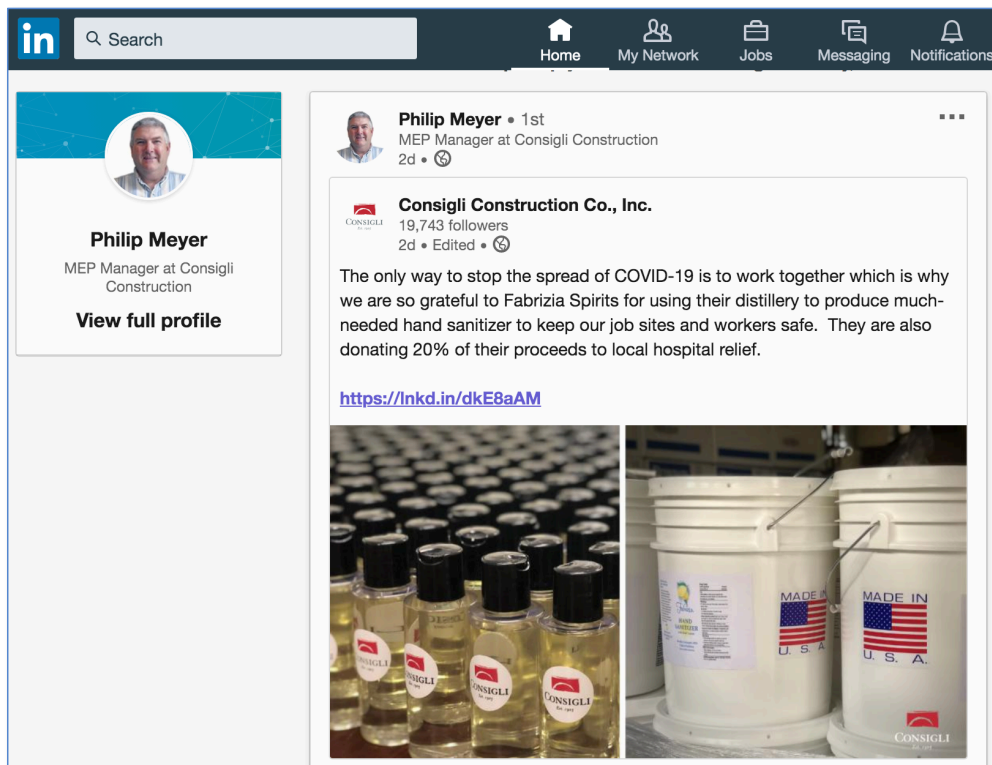
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5S



# Where can I find disinfectant?



**Philip Meyer** • 1st  
MEP Manager at Consigli Construction  
2d • 🌐

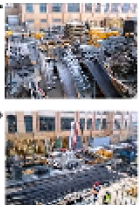
**Consigli Construction Co., Inc.**  
19,743 followers  
2d • Edited • 🌐

The only way to stop the spread of COVID-19 is to work together which is why we are so grateful to Fabrizia Spirits for using their distillery to produce much-needed hand sanitizer to keep our job sites and workers safe. They are also donating 20% of their proceeds to local hospital relief.

<https://lnkd.in/dkE8aAM>

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# Where can I find disinfectant?

**Philip Meyer**  
MEP Manager at Consigli Construction  
[View full profile](#)

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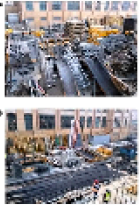
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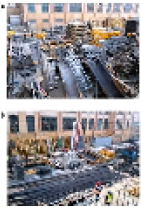
**5S**



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- Shift end = **Last 40 minutes**
  - **Reflect** + Disinfect

**5S**



## Primary Lean Principle = **CONTINUOUS IMPROVEMENT**

During ***“Reflect + Disinfect”***



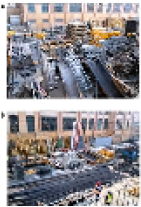
Ask workers to pause and reflect daily on:

- **What is working well** that we should keep doing?
- **What is not working well** that we should change?
- **How** can we make those changes?
- **Who** will be responsible for those changes?

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## Primary Lean Principle = **CONTINUOUS IMPROVEMENT**



If your workers are required to “*Work From Home*,” ask them to pause and reflect on the last **6 months**:

- **What is working well** that we should keep doing?
- **What is not working well** that we should change?
- **How** can we make those changes?
- **Who** will be responsible for those changes?

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**WS SC LPS 5S**



### Creating a Leaner Supply Chain



**Procurement**

Avoid duplicate procedures in different departments.



**Manufacturing**

Improving quality and precision prevents defects and returned goods.



**Warehousing**

Keep inventory levels as low as is reasonable.



**Transportation**

Consolidate multiple products into a single shipment.

 the balance

<https://www.thebalancesmb.com/lean-supply-chain-management-2221274>

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SC



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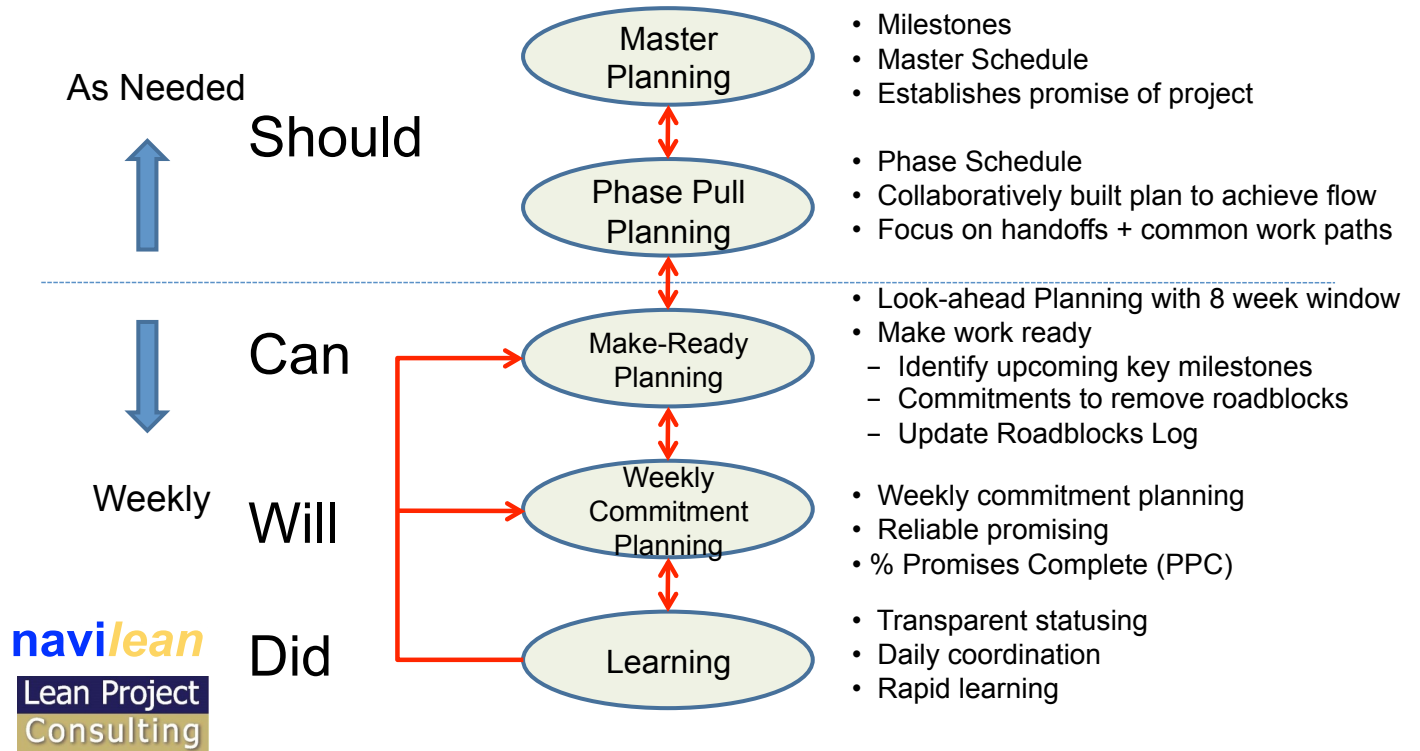
LPS



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# Last Planner® System: Should-Can-Will-Did Planning

## Creating and maintaining *reliable workflow*



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Consulting

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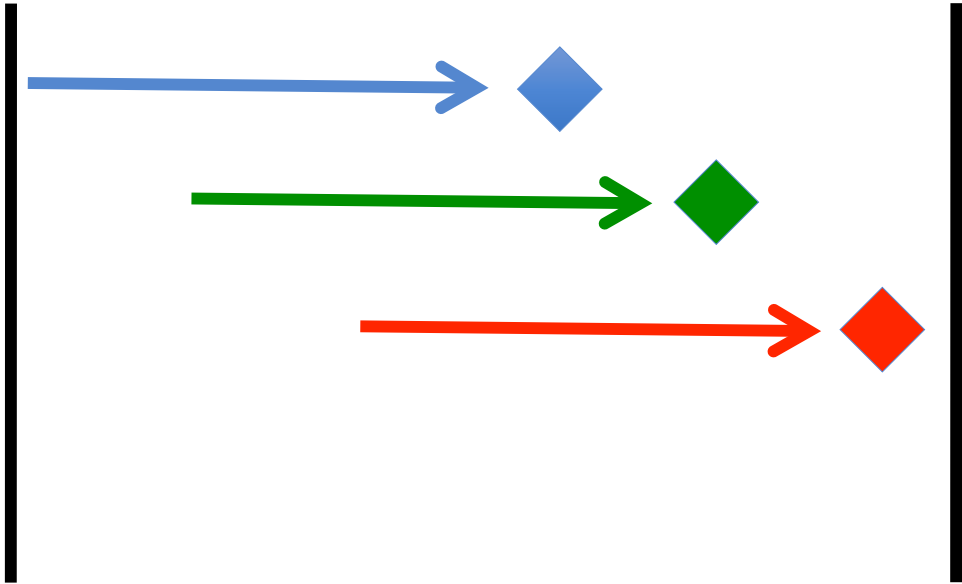
**LPS**



Master Planning

- Milestones
- Master Schedule
- Establishes promise of project

Project Start



Project End

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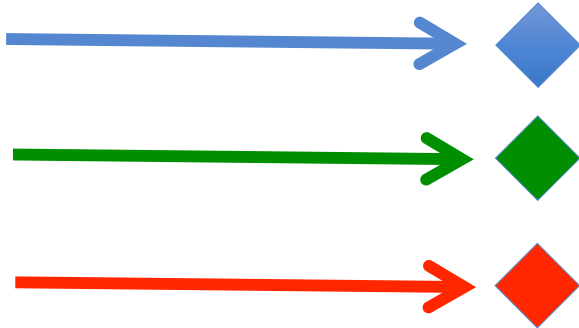
**LPS**



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**LPS**



Master Planning

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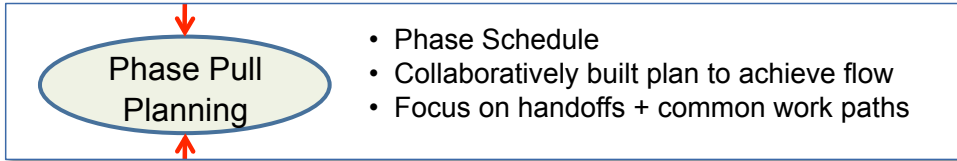


Project End

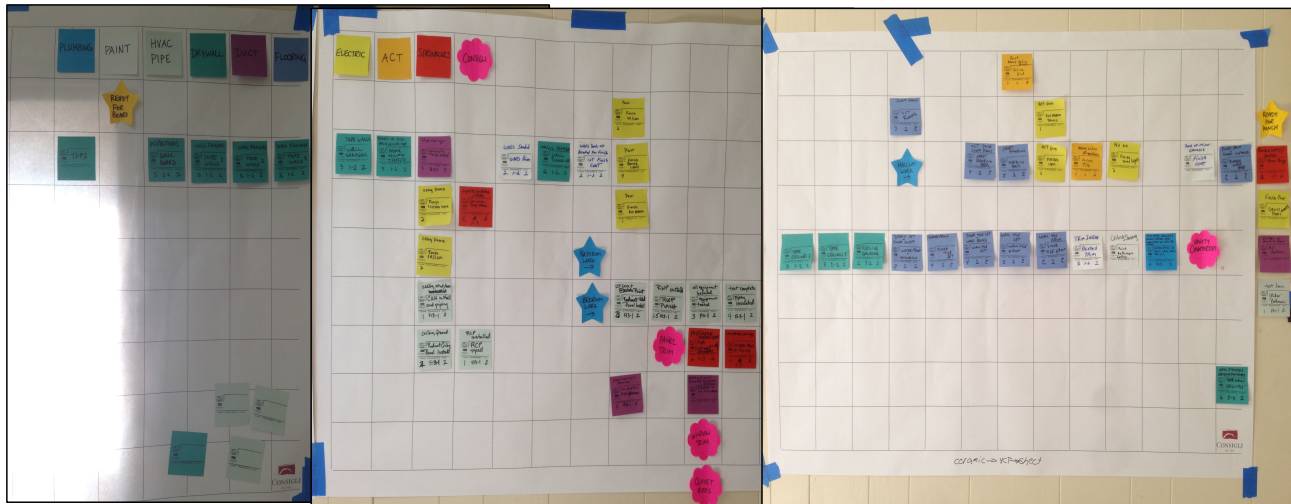
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# LPS



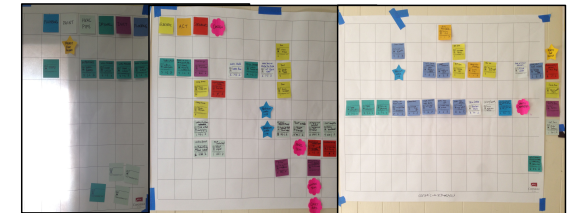
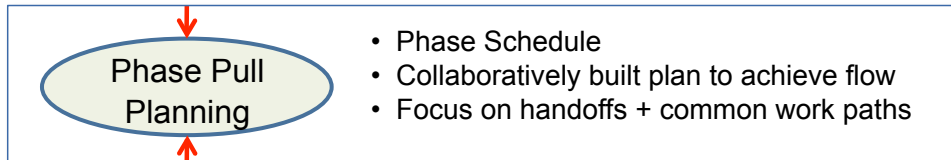
***Go slow to go fast!***



If we plan well,  
**BAECL** we will execute as planned!

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# LPS



Work plans can **always** be improved with better:

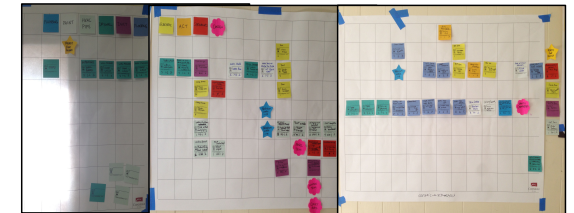
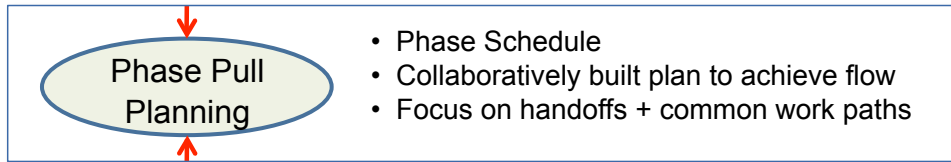
- Work task definitions (scope)
- Crew sizes and durations
- Work sequencing
- **Buffers of time or space = Social Distancing**
- Handoff between Trade Partners
- Work leveling → Takt planning

If **we** plan well,

**BAECL** we will execute as planned!

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LPS



Work plans can **always** be improved with better:

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If **we** plan well,  
**BAECL** we will execute as planned!

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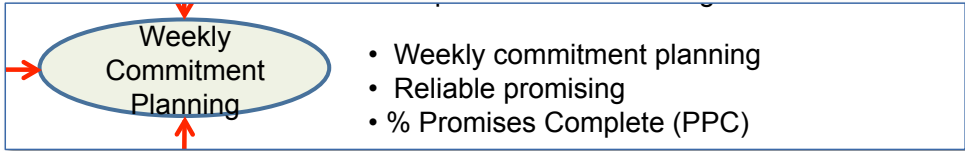








LPS



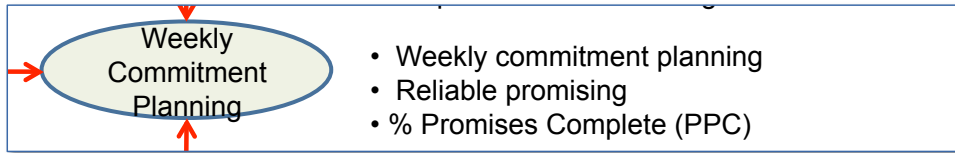
What **work zones** would **ensure** social distancing between Trade Partners?



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LPS



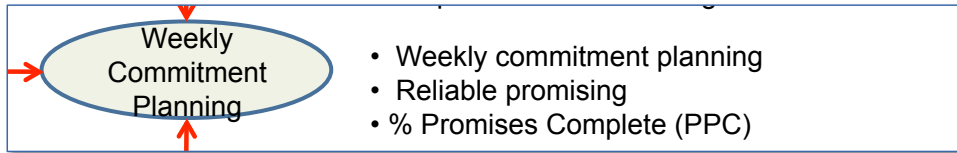
What **work zones** would **ensure** social distancing between Trade Partners?



**CURT's April 2<sup>nd</sup> webinar:**  
Set up mannequins to help workers remember what staying 6 feet / 2 meters apart means



LPS

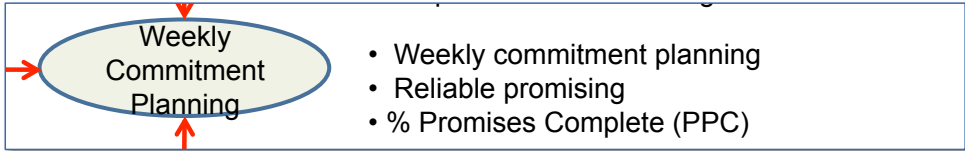


What **work zones** would **ensure** social distancing between Trade Partners?

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LPS



What **work zones** would **ensure** social distancing between Trade Partners?

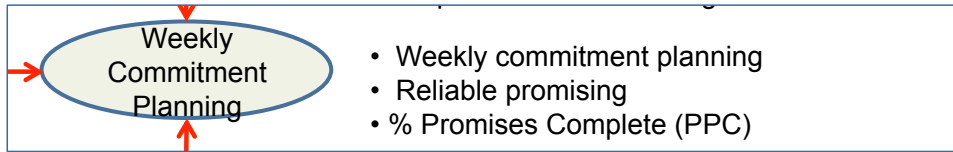
- Columns A-B
- Columns B-C
- Columns C-D
- Columns D-E
- Columns E-F
- Columns F-G
- Columns G-H
- Columns H-I
- Columns I-J
- Columns J-K

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LPS



What **work zones** would **ensure** social distancing between Trade Partners?

- Columns A-B
- Columns B-C
- Columns C-D
- Columns D-E
- Columns E-F
- Columns F-G
- Columns G-H
- Columns H-I
- Columns I-J
- Columns J-K

**Week 1**

M T W Th F S

Columns A-B					
Columns B-C	■	■	■	■	■
Columns C-D					
Columns D-E	■	■	■	■	■
Columns E-F					
Columns F-G	■	■	■	■	■
Columns G-H					
Columns H-I	■	■	■	■	■
Columns I-J					
Columns J-K	■	■	■	■	■

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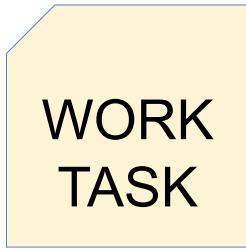
**LPS**



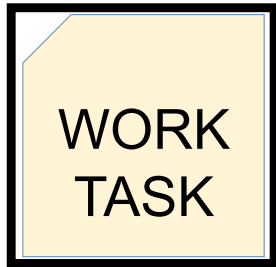
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Learning

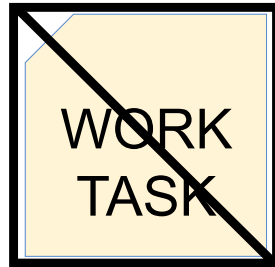
- Transparent statusing
- Daily coordination
- Rapid learning



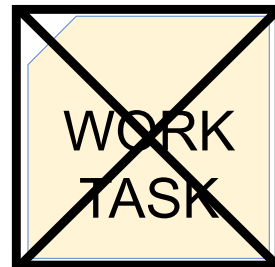
Planned



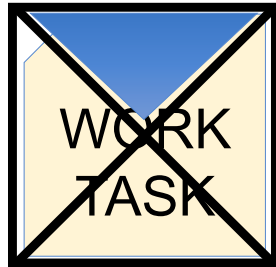
In-Progress



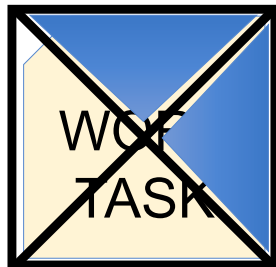
Complete



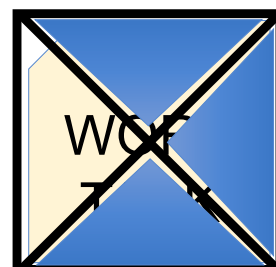
Confirmed



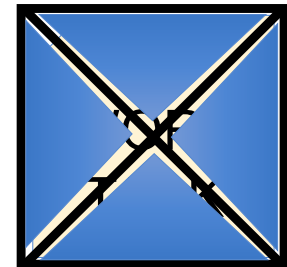
Next-Trade  
Approved



CM-GC  
Approved



Quality  
Approved



Punchlist  
Approved

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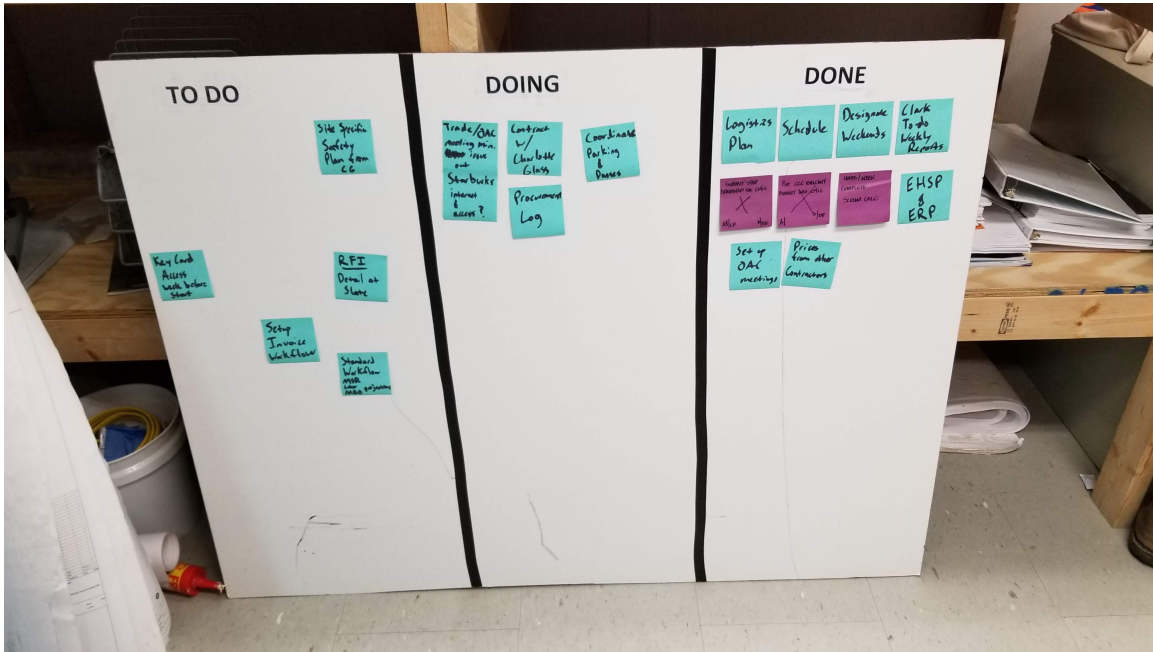
LPS



↓

Learning

- Transparent statusing
- Daily coordination
- Rapid learning



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DPR  
CONSTRUCTION

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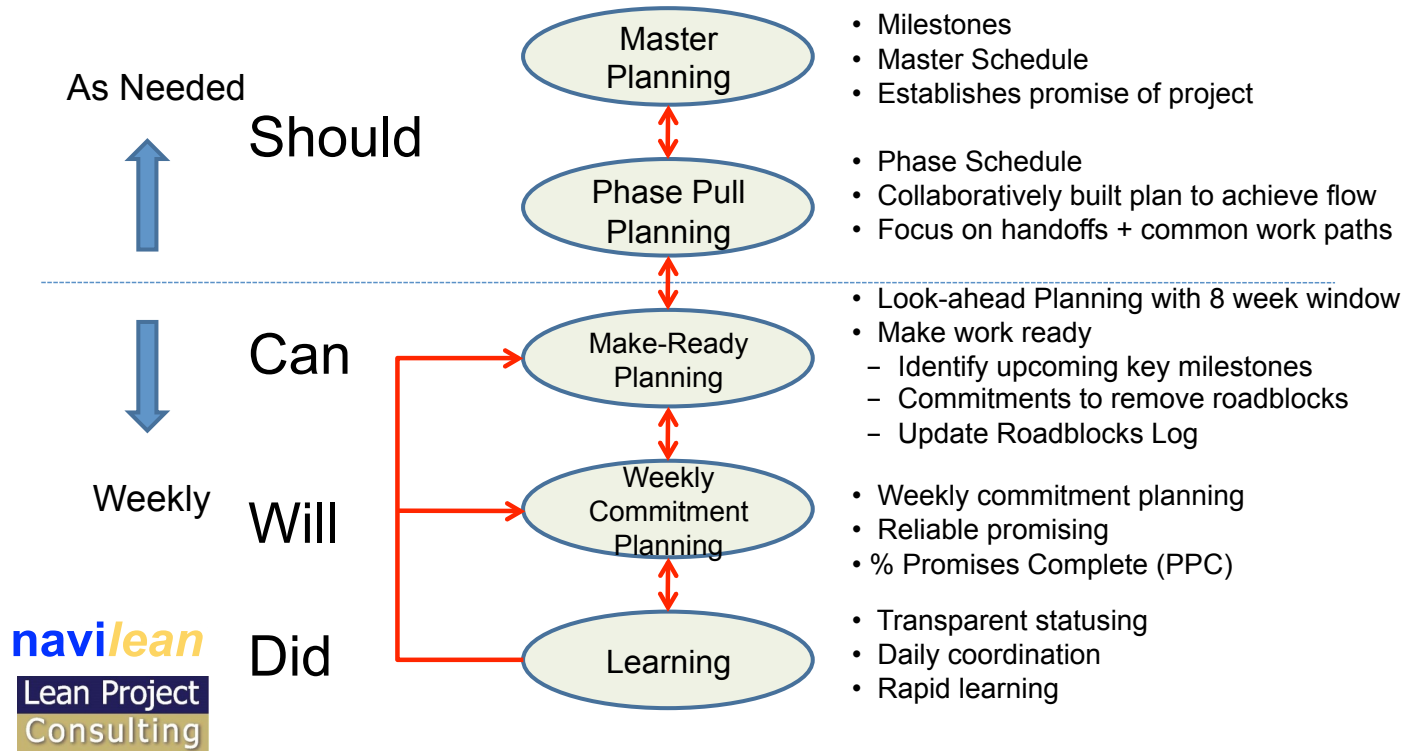
LPS



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# Last Planner® System: Should-Can-Will-Did Planning

## Creating and maintaining *reliable workflow*



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# WORK SHIFTS

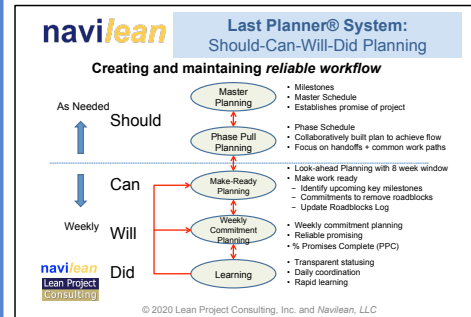


# SUPPLY CHAIN



Future Session?

# LAST PLANNER



# 5S



*“How do you determine the ROI for these extra efforts added because of COVID-19?”*

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*~~“How do you determine the ROI for these extra efforts added because of COVID-19 implementing Lean on projects?”~~*

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*“How do you determine the ROI for ~~these extra efforts added because of COVID-19~~ implementing Lean on projects?”*

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To appear in *Proceedings of the 8th Annual Conference of the International Group for Lean Construction*,  
17-19 July 2000, Brighton, U.K.

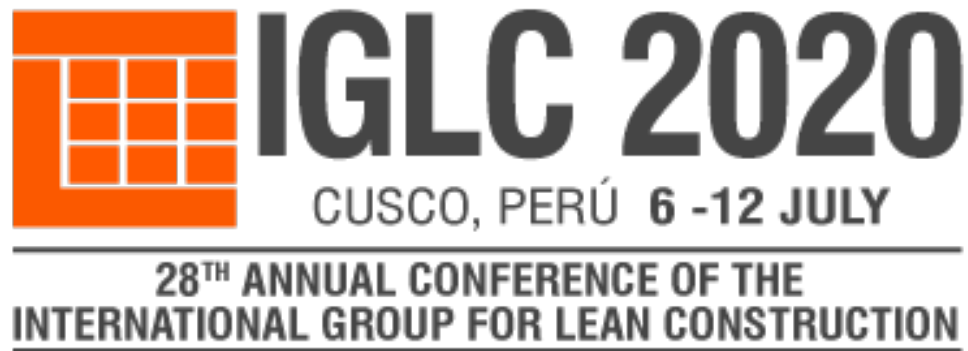
## **CASE STUDY FOR WORK STRUCTURING: INSTALLATION OF METAL DOOR FRAMES**

**Cynthia C.Y. Tsao<sup>1</sup>, Iris D. Tommelein<sup>2</sup>, Eric Swanlund<sup>3</sup>, and Gregory A. Howell<sup>4</sup>**

### **ABSTRACT**

Work structuring means developing a project's process design while trying to align engineering design, supply chain, resource allocation, and assembly efforts. The goal of work structuring is to make work flow more reliable and quick while delivering value to the customer. Current work structuring practices are driven by contracts, the history of

*“How do you determine the ROI for ~~these extra efforts added because of COVID-19~~ implementing Lean on projects?”*



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*“How do you determine the ROI for ~~these extra efforts added because of COVID-19~~ implementing Lean on projects?”*



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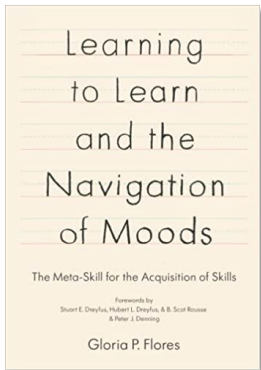
*“How do you determine the ROI for ~~these extra efforts added because of COVID-19~~ implementing Lean on projects?”*



**“Results don’t convince.”**  
- Greg Howell

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## “Quality installed work”

Moods that get in the way of learning	Moods that are conducive to learning
<ul style="list-style-type: none"><li>• Confusion</li><li>• Resignation</li><li>• Frustration</li><li>• Arrogance</li><li>• Impatience</li><li>• Boredom</li><li>• <b>Fear / Anxiety</b></li><li>• <b>Overwhelm</b></li><li>• <b>Lack of Confidence (insecurity)</b></li><li>• <b>Distrust or Skepticism</b></li></ul>	<ul style="list-style-type: none"><li>• Wonder</li><li>• Perplexity</li><li>• Serenity / Acceptance</li><li>• Patience</li><li>• <b>Ambition</b></li><li>• <b>Resolution</b></li><li>• Confidence</li><li>• Trust</li></ul>

Do you have **ambition** and the **resolution** to uphold Lean principles?

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# Primary Lean Principle = **CONTINUOUS IMPROVEMENT**



# Primary Lean Principle = **RESPECT FOR PEOPLE**

Do you have **ambition** and the **resolution** to uphold Lean principles?

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**“After I explain Lean Construction to people, they often say to me, ‘Well, that’s just common sense’...**



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**“After I explain Lean Construction to people, they often say to me, ‘Well, that’s just common sense’...**



**...well, unfortunately,  
the sense isn’t common.”**

**- Greg Howell**

**BAECL**

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WEBINAR

# Stay Calm and Continue Applying Lean During Covid-19

Cynthia CY Tsao

April 9, 2019 (8:00 AM to 9:30AM) PDT



# BAECL

Building AEC Learning  
to efficiently and effectively serve society

**Open Source COVID-19 Solutions  
for Rapid Expansion of Healthcare Facilities**

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**Building AEC Learning**  
to efficiently and effectively serve society

**Open Source COVID-19 Solutions**  
**for Rapid Expansion of Healthcare Facilities**

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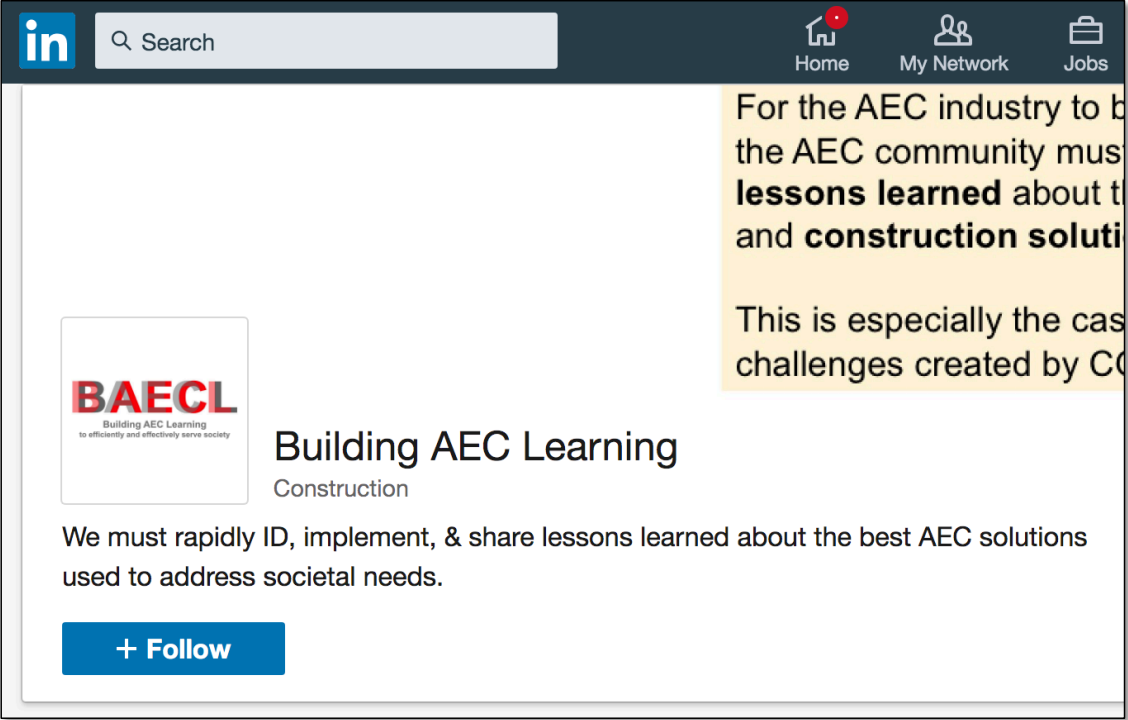
Building AEC Learning  
to efficiently and effectively serve society

**Open Source COVID-19 Solutions  
for Rapid Expansion of Healthcare Facilities**

For the AEC industry to be efficient and effective in serving society, the AEC community must **rapidly identify, implement, and share lessons learned** about the **best regulatory, design, supply chain, and construction solutions** used to address societal needs. This is especially the case now as we are all in the midst of the challenges created by COVID-19.



# Follow us on LinkedIn



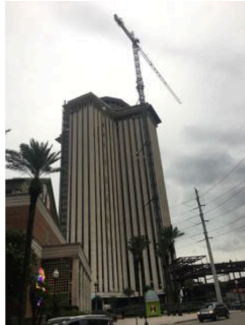
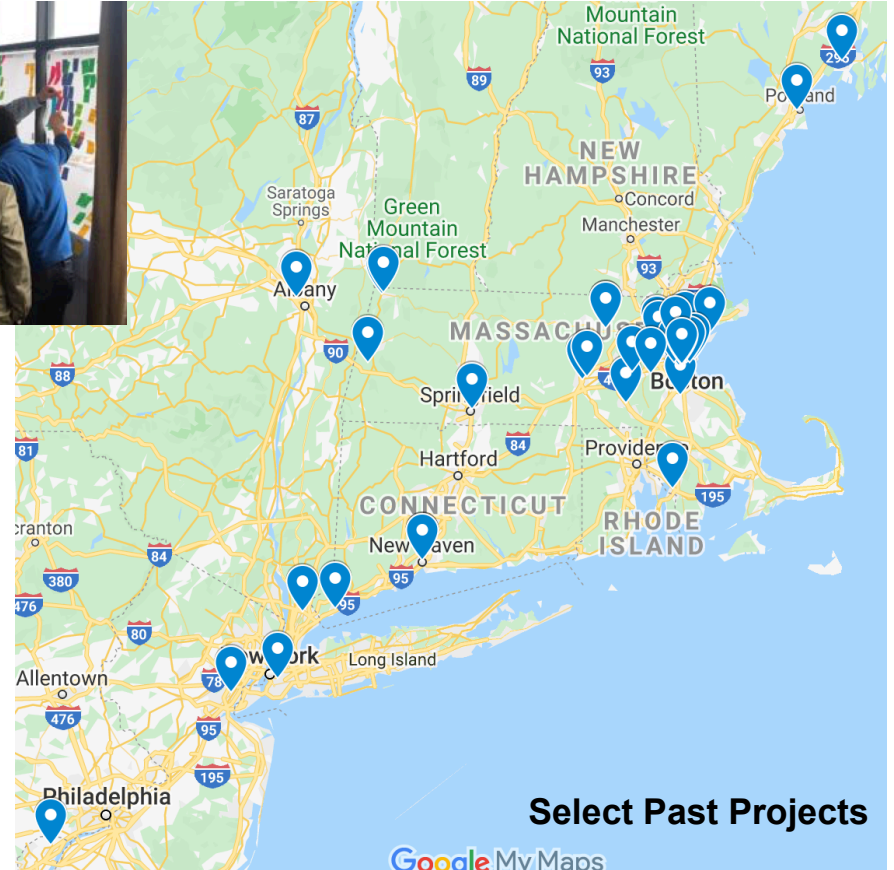
The screenshot shows the LinkedIn profile page for Building AEC Learning. At the top, there is a search bar and navigation icons for Home, My Network, and Jobs. The profile picture is a square with the BAECL logo and the text "Building AEC Learning to efficiently and effectively serve society". The name "Building AEC Learning" is displayed in a large font, with "Construction" listed below it. A blue "+ Follow" button is at the bottom left. A yellow text box on the right contains the following text: "For the AEC industry to b the AEC community must **lessons learned** about t and **construction soluti** This is especially the cas challenges created by CO".

# Follow us on Twitter



The screenshot shows the Twitter profile page for Building AEC Learning. The profile picture is a circular logo with the BAECL text and the tagline "Building AEC Learning to efficiently and effectively serve society". Below the profile picture, the name "Building AEC Learning" and the handle "@BAECL\_Solutions" are shown. A blue "Following" button is on the right. The bio reads: "An open-source platform for sharing the best regulatory, design, supply chain, + construction solutions to rapidly expand the capacity of healthcare facilities". At the bottom, it says "Boston, MA" and "Joined April 2020".





**QUESTIONS?**

[cynthia@navilean.com](mailto:cynthia@navilean.com)

<https://www.linkedin.com/in/ccytsao/>

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