24TH ANNUAL

24TH LCI CONGRESS
OCTOBER 18-21

Solving Organizational Problems from the Inside Out

Elena Antil, Kim Bulman, Ryan James, and Shannon Kane

LEAN GUMBO: THE RIGHT INGREDIENTS FOR PROJECT SUCCESS

October 19, 2022

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Your Panelists

Elena Antil

Planning & Control Manager

Kim Bulman

Implementation Manager

Ryan James

Superintendent

Shannon Kane

Assistant Safety Supervisor

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Daniel O'Connell's Sons: Firm Overview

ESTABLISHED 1879

143 Years
Established 1879

$200M
Annual Revenue

200
Employees

5
Regional Offices

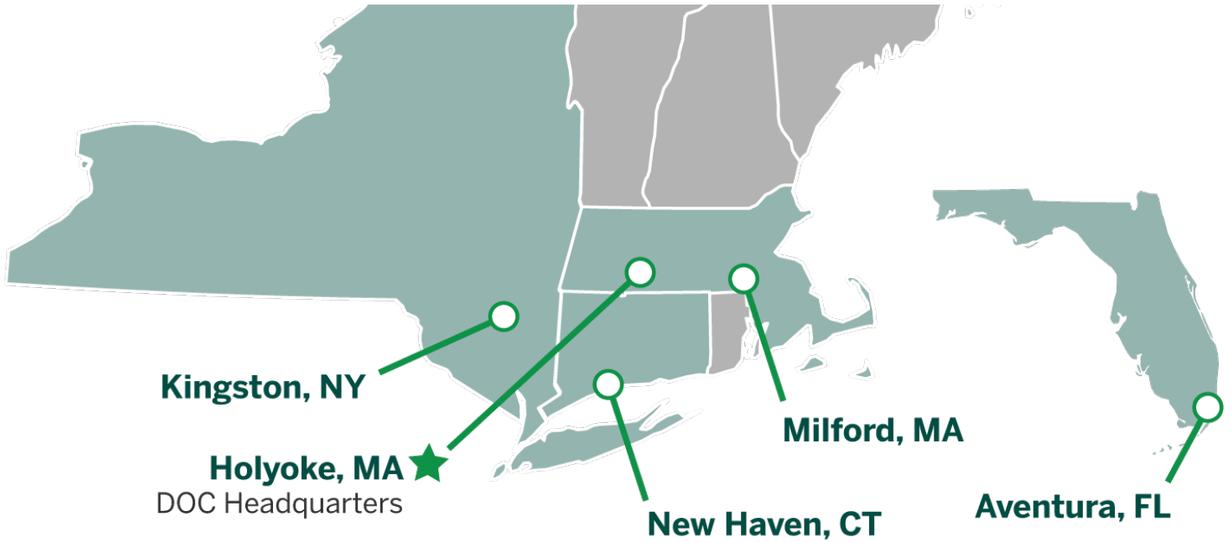
15 Years
Average Tenure of Employees

Building and Heavy/Civil Work

UMass Amherst
South College

MDC Aeration & Final
Settling Tanks, Hartford, CT

5 Office Locations



Daniel O'Connell's Sons
Headquarters
800 Kelly Way
Holyoke, MA 01040

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Agenda

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- Problem Statement
- Problem Solving Process
- A3 Tool
- On-Boarding Example
- Lessons Learned

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Problem Statement

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Problem Statement

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Problem Statement

Things within our company could be improved...

...but how?

Problem-Solving Process

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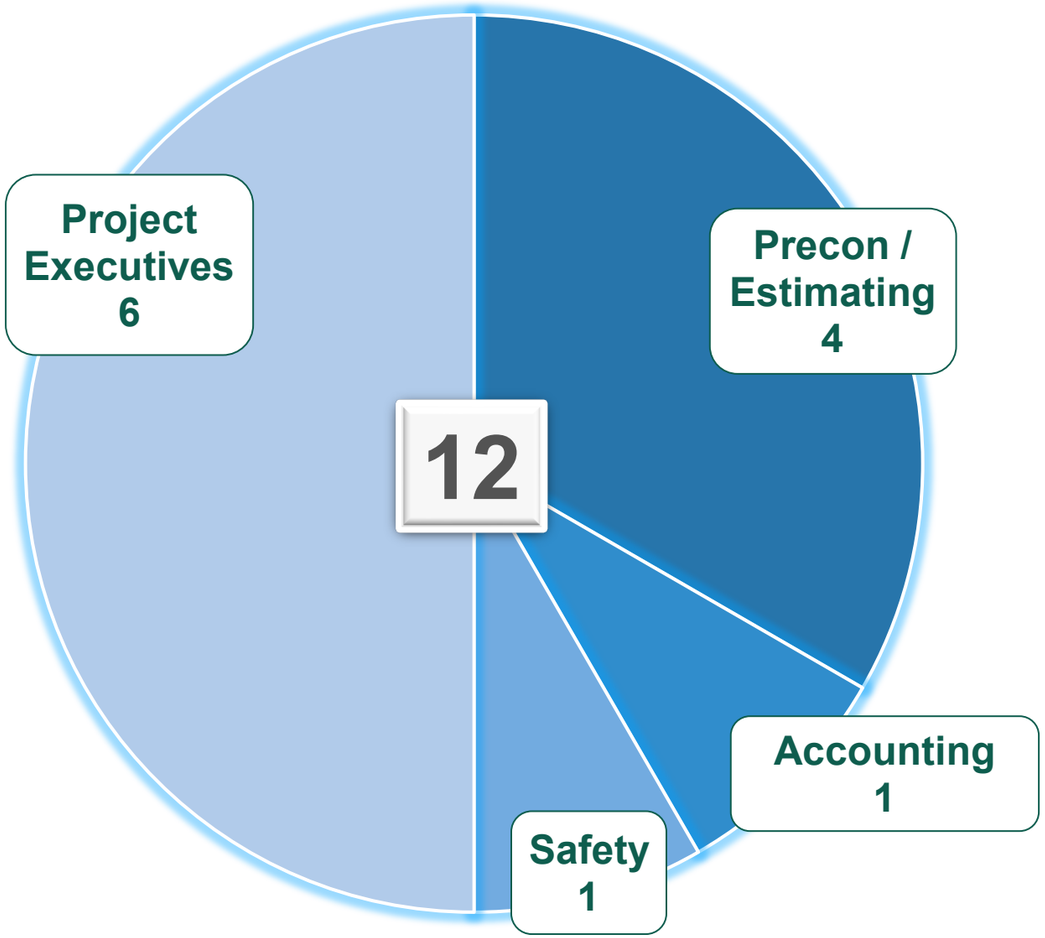
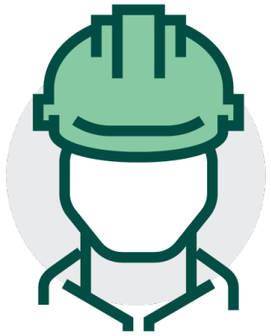
Leadership Teams



Executive Leadership Team (ELT)

Senior Leadership Team (SLT)

Company Objectives



World Class Safety

Client Service Excellence

A Talent Driven Organization

A Leading Edge Company

Achieve Sustainable Growth

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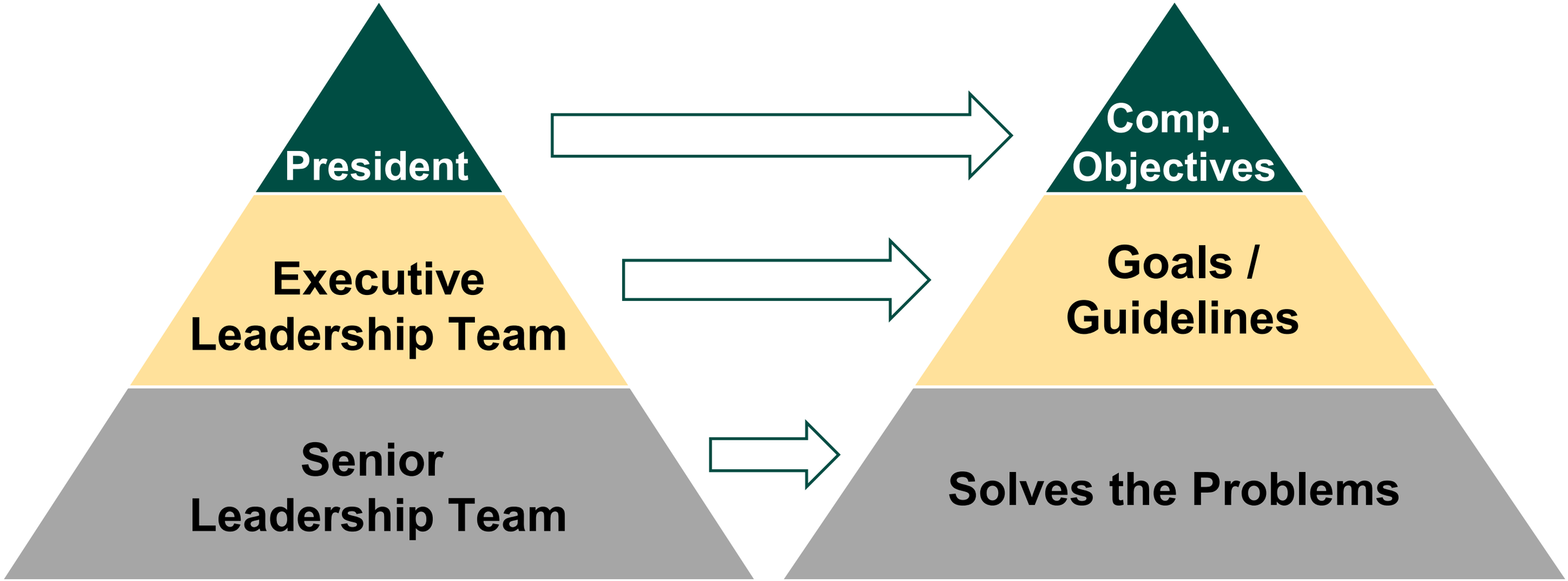
The Problem-Solving Process



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Annual Leadership Meeting

Company Objectives

Brainstorming Groups

Present Ideas

Vote on Initiatives

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Leadership Group Initiatives

- Career Start Program
- Paperless Safety Documentation
- **New Employee On-Boarding**
- Lessons Learned Database
- Employee Core Competencies
- Post-Construction Contacts
- Diversity, Equity, and Inclusion
- Standard Operating Procedures
- EMR Education
- Young Engineers Network

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Post Meeting Tasks

Small Groups

Virtual Meetings

A3

PROBLEM SOLVING

A3 Format

Up to 1 year to implement

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A3 Thinking

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A-3thrink-ing noun

Definition of ***A3thrinking:***

*A·**thrink**·ing*

1: The action of using the A3 tool to organize thoughts while engaged in the problem-solving process, generally in Lean Construction.

Example: *“Elena used her A3thrinking abilities to teach Lean practices to her colleagues.”*

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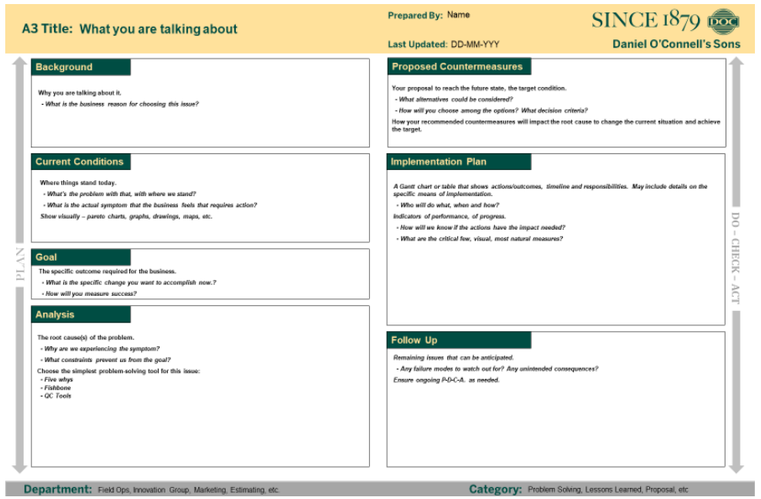
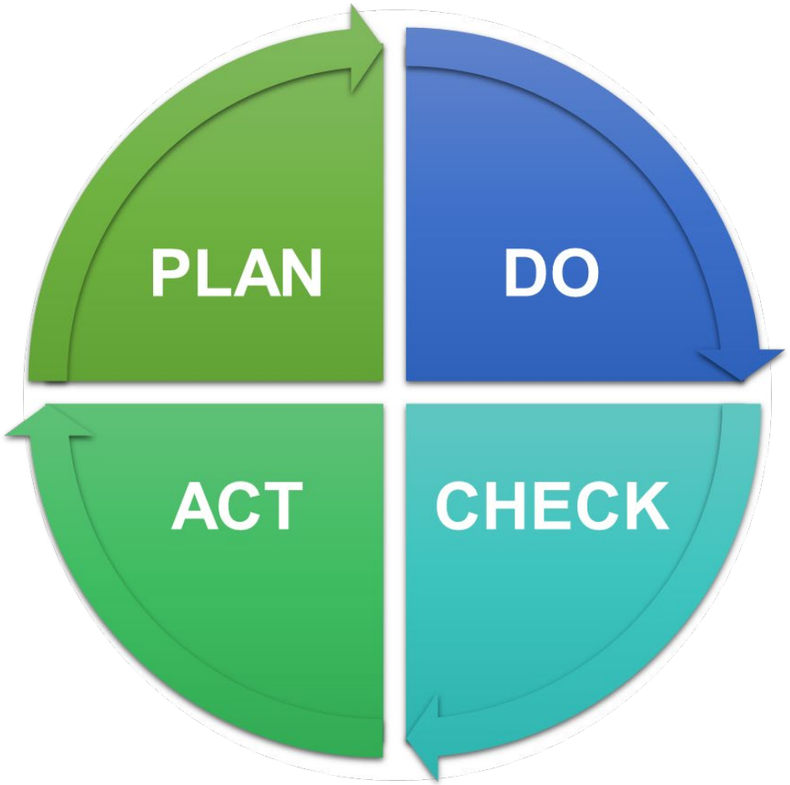
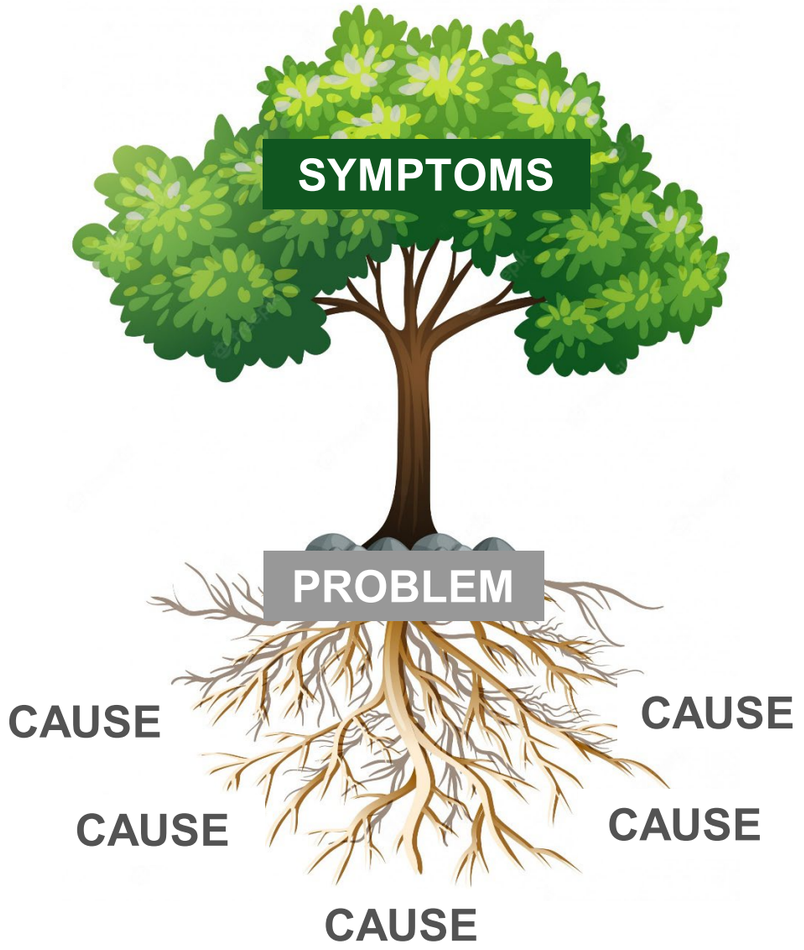
Our Secret Weapon – A3 Thinking







Background

What is the problem or issue you are trying to solve?

Current Conditions

Where do we stand?

PLAN

Goal

What do we want to achieve? Set a target

Analysis

What are the root causes of the problem?

Ask 5 Whys

Proposed Countermeasures

What steps do we plan to take to address the problem?

Implementation Plan

DO

CHECK

ACT

Follow Up

What issues can we anticipate?

Check implemented plan.

Can we improve it?

A3 Title: What you are talking about

Prepared By: Name

Last Updated: DD-MM-YYY

SINCE 1879

Daniel O'Connell's Sons

PLAN

Background

Why you are talking about it.

- What is the business reason for choosing this issue?

Current Conditions

Where things stand today.

- What's the problem with that, with where we stand?

- What is the actual symptom that the business feels that requires action?

Show visually – pareto charts, graphs, drawings, maps, etc.

Goal

The specific outcome required for the business.

- What is the specific change you want to accomplish now?

- How will you measure success?

Analysis

The root cause(s) of the problem.

- Why are we experiencing the symptom?

- What constraints prevent us from the goal?

Choose the simplest problem-solving tool for this issue:

- Five whys

Proposed Countermeasures

Your proposal to reach the future state, the target condition.

- What alternatives could be considered?

- How will you choose among the options? What decision criteria?

How your recommended countermeasures will impact the root cause to change the current situation and achieve the target.

Implementation Plan

A Gantt chart or table that shows actions/outcomes, timeline and responsibilities. May include details on the specific means of implementation.

- Who will do what, when and how?

Indicators of performance, of progress.

- How will we know if the actions have the impact needed?

- What are the critical few, visual, most natural measures?

Follow Up

Remaining issues that can be anticipated.

- Any failure modes to watch out for? Any unintended consequences?

Ensure ongoing P-D-C-A. as needed.

DO – CHECK – ACT

Department: Field Ops, Innovation Group, Marketing, Estimating, etc.

Category: Problem Solving, Lessons Learned, Proposal, etc.

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Example:
New Employee On-Boarding

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What is our implementation plan:

Who, What, Where, How?

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Goal

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Analysis

What a

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Lessons Learned

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What we have learned ...

- Start at the top
- Take small bites
- Group size
- Pick a captain

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What we have learned ...

- Complaining is Easy, Doing is Hard

- Passionate Topics

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What we have learned ...

Be Prepared to Fail

What we have learned ...

- **Use A3 to Organize your Problem-Solving Process**

A3

PROBLEM SOLVING

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OCTOBER 18-21

Transforming a 100-year-old Engineering Group using Lean Thinking

Nick Ambrosino, Elena Antil, Elizabeth Brosnan, Kimberly Bulman
Daniel O'Connell's Sons

LEAN GUMBO: THE RIGHT INGREDIENTS FOR PROJECT SUCCESS

OCTOBER 19, 2022

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Your Panelists

Elena Antil

Planning & Control Manager

Nick Ambrosino

VDC Manager

Elizabeth Brosnan

Principal Scheduler

Kim Bulman

Implementation Manager

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Agenda

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- Background
- Lean in VDC
- Lean in Implementation
- Lean in Scheduling
- Lessons Learned

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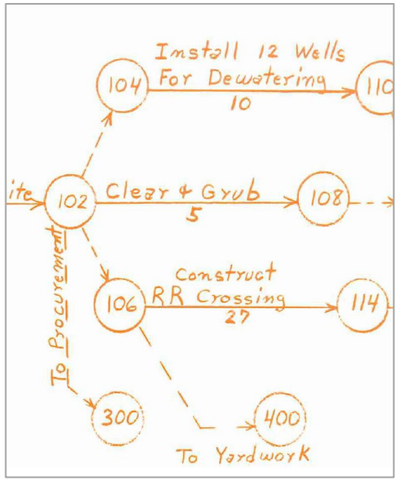
History of Innovation at DOC

1880s – 1990s
Engineering Group

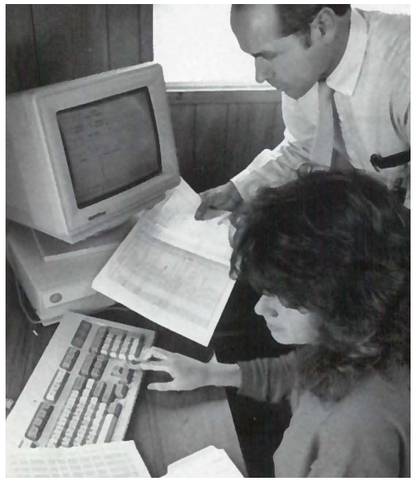
1885

Optical Land Surveying



1965

Critical Path Method



1966

First Computer

1973

Layout by Laser

1985

PCs, AutoCAD, Primavera

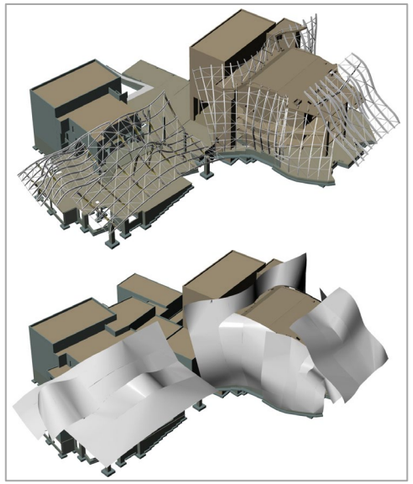
AUTOCAD

1988

First Internal Network

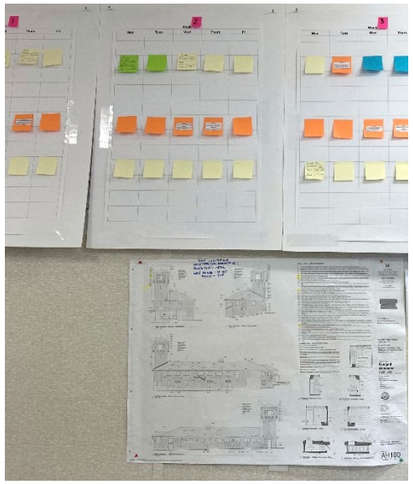
History of Innovation at DOC

2000s – 2020s



2001

3D Modeling Software



2012

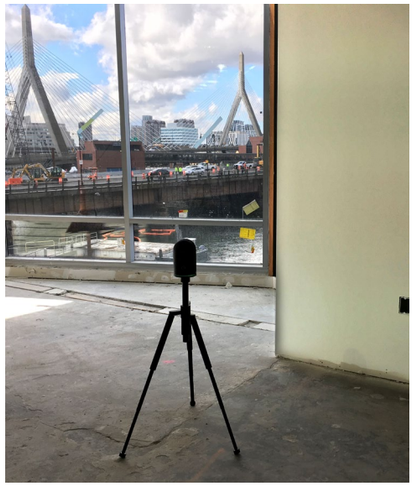
IPD and Lean Principles

2013

Drones

Leica BLK360 Laser Scanner

2018

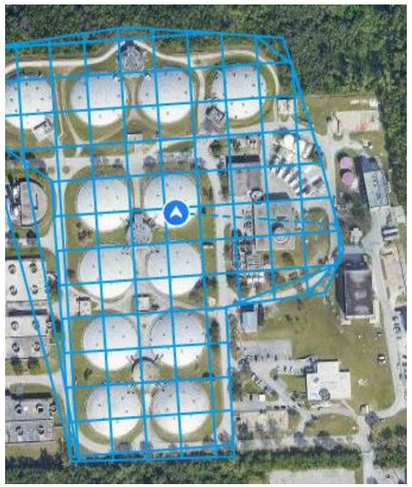


Innovation Group Formed

2020

Drone Mapping Software

2021



Our Lean Journey before-COVID (BC)

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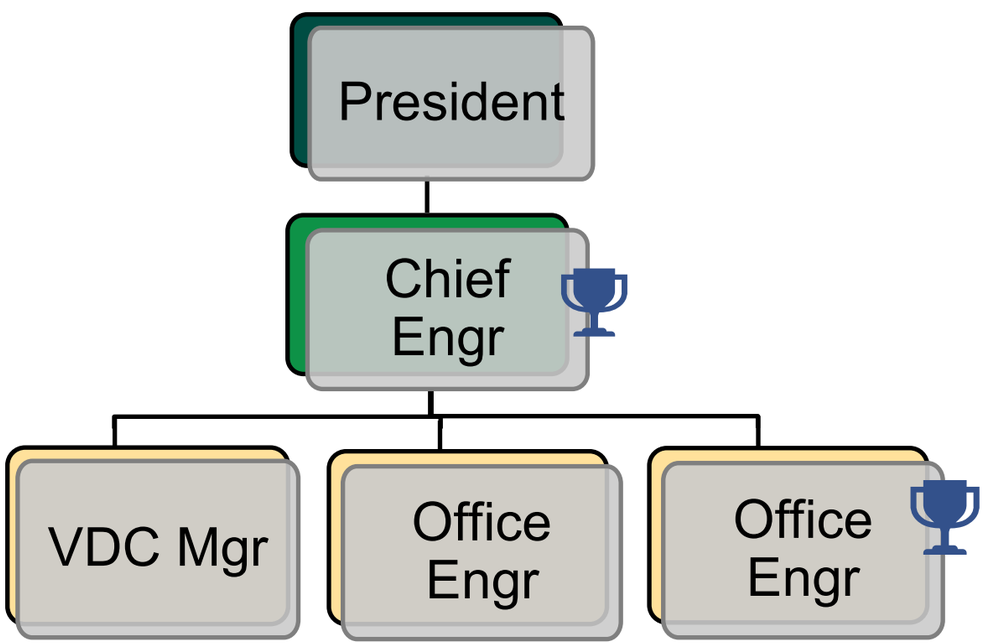
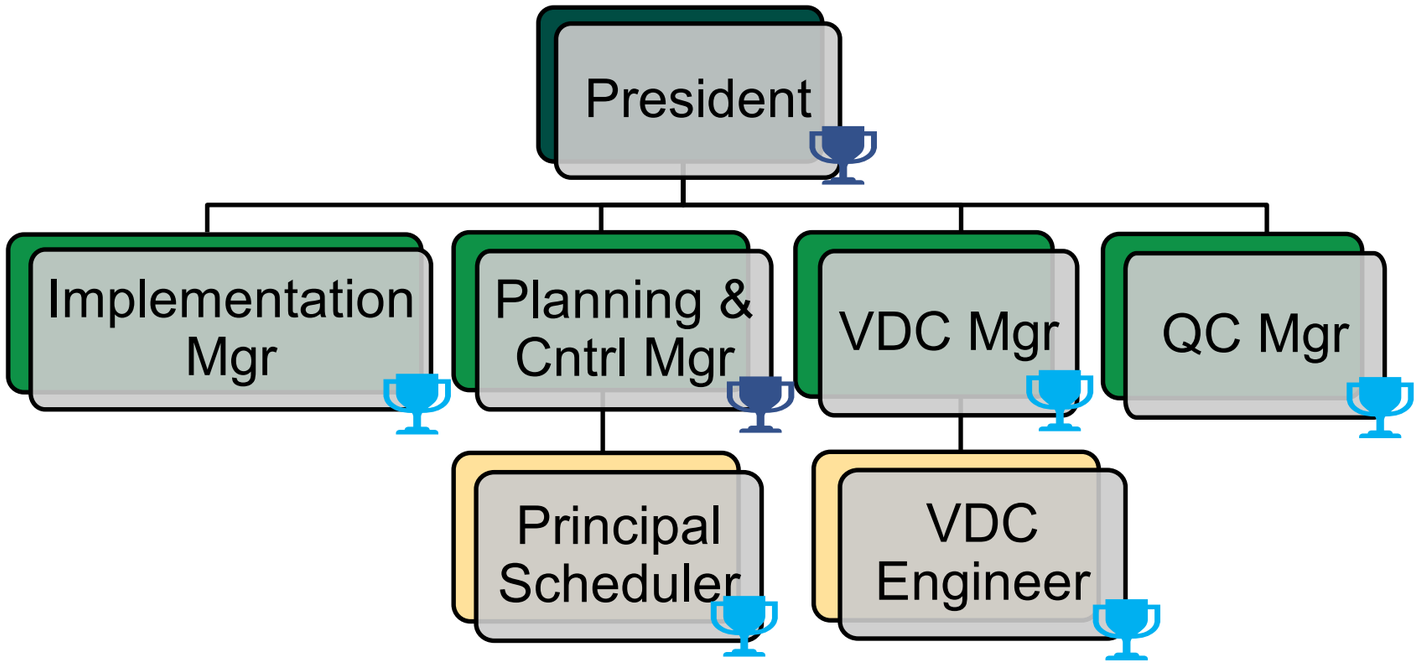
Lean Journey - Engineering to Innovation Group





ENGINEERING → **INNOVATION**

LEAN CHAMPION

FUTURE LEAN CHAMPION

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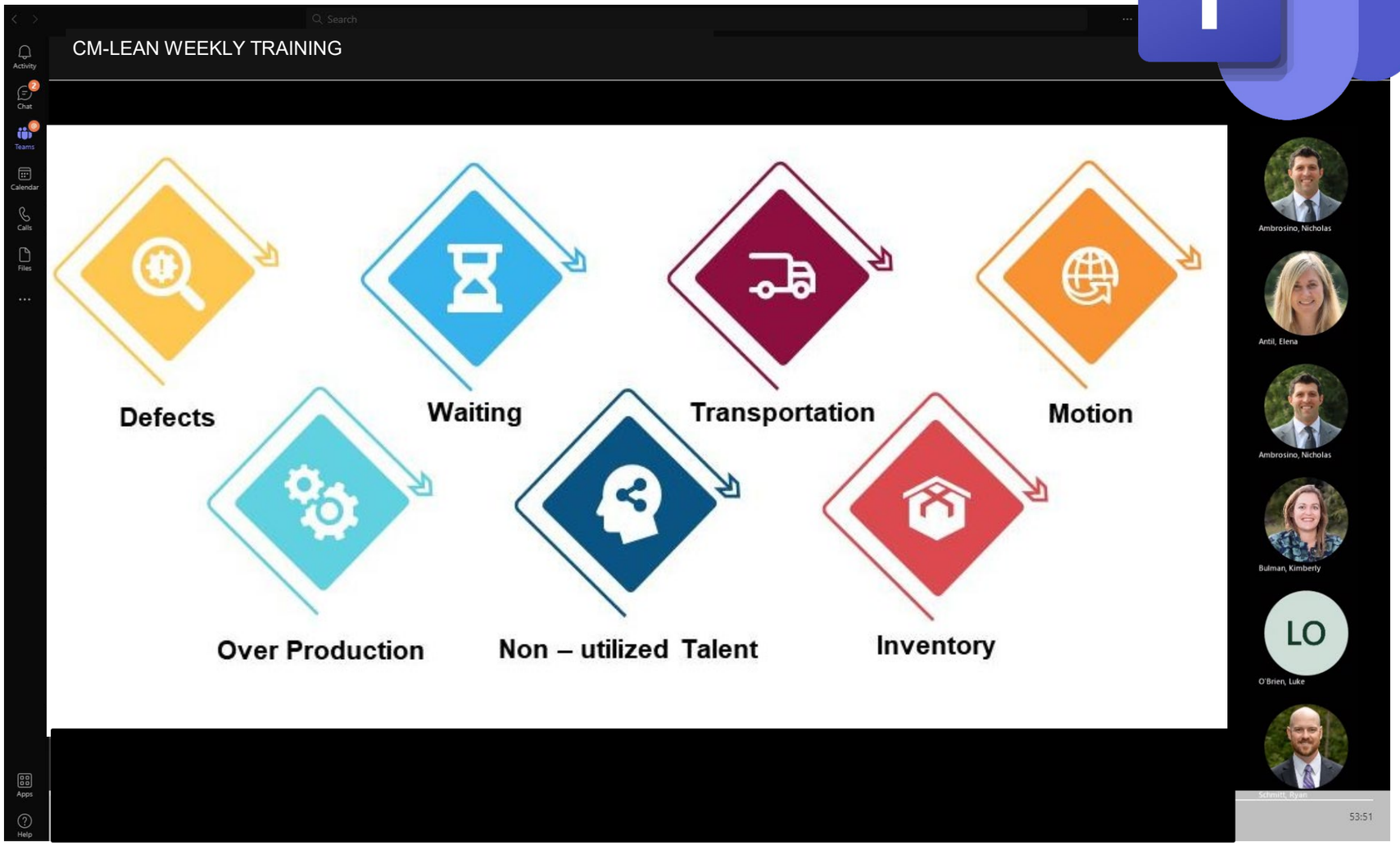
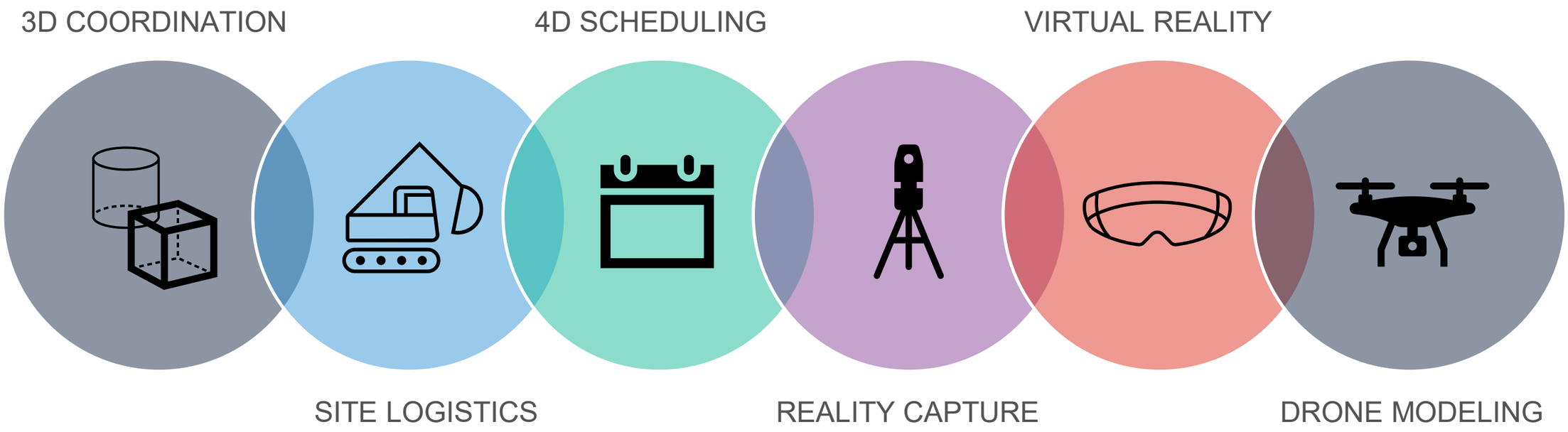
The Transformation Begins

Lean Training



Virtual Design and Construction (VDC)



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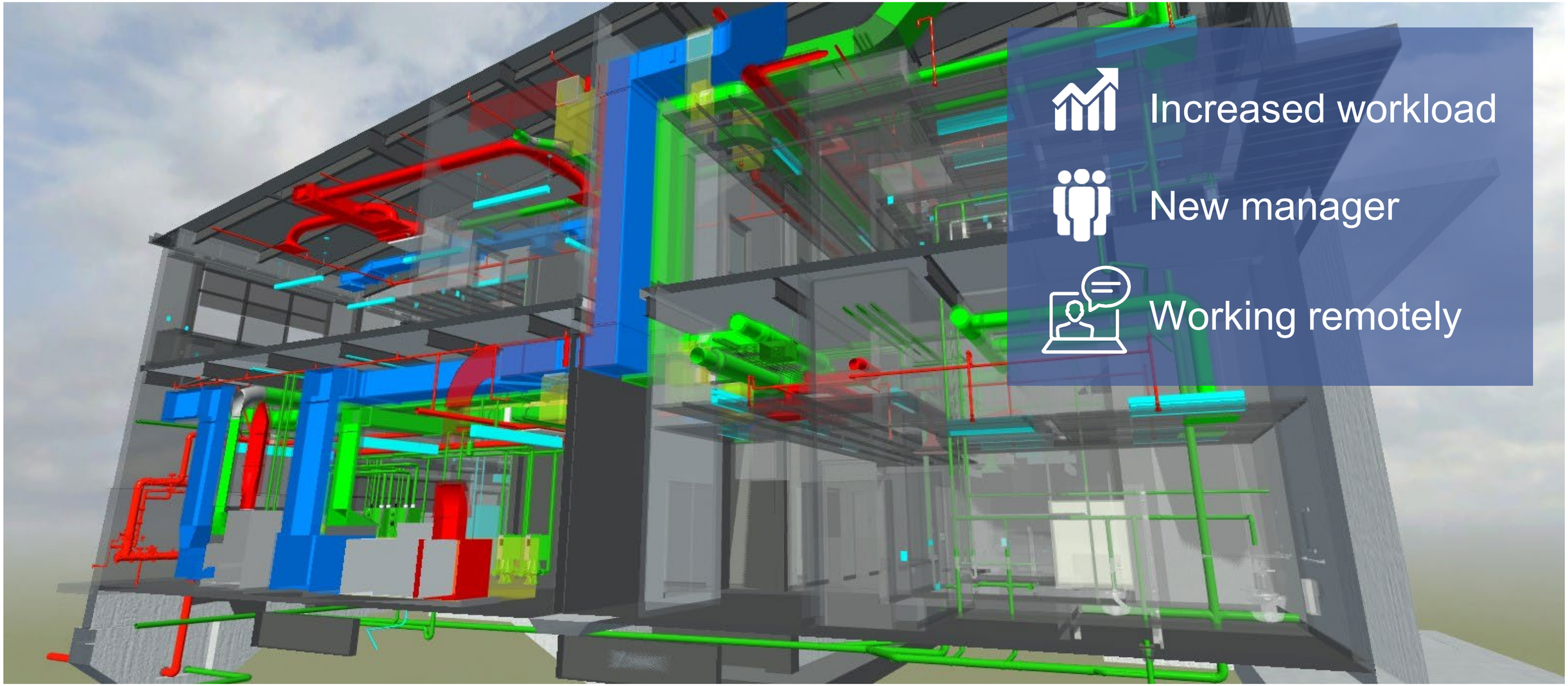
VDC Challenges



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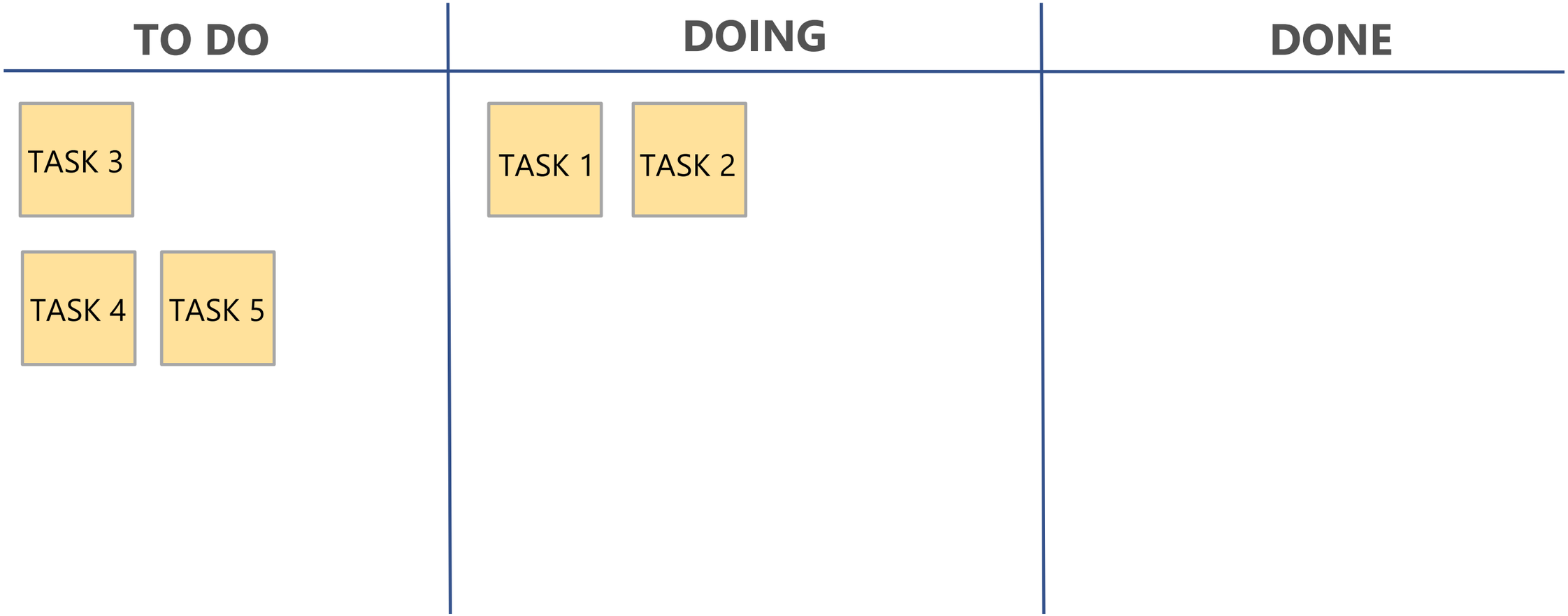
VDC Kanban 看板



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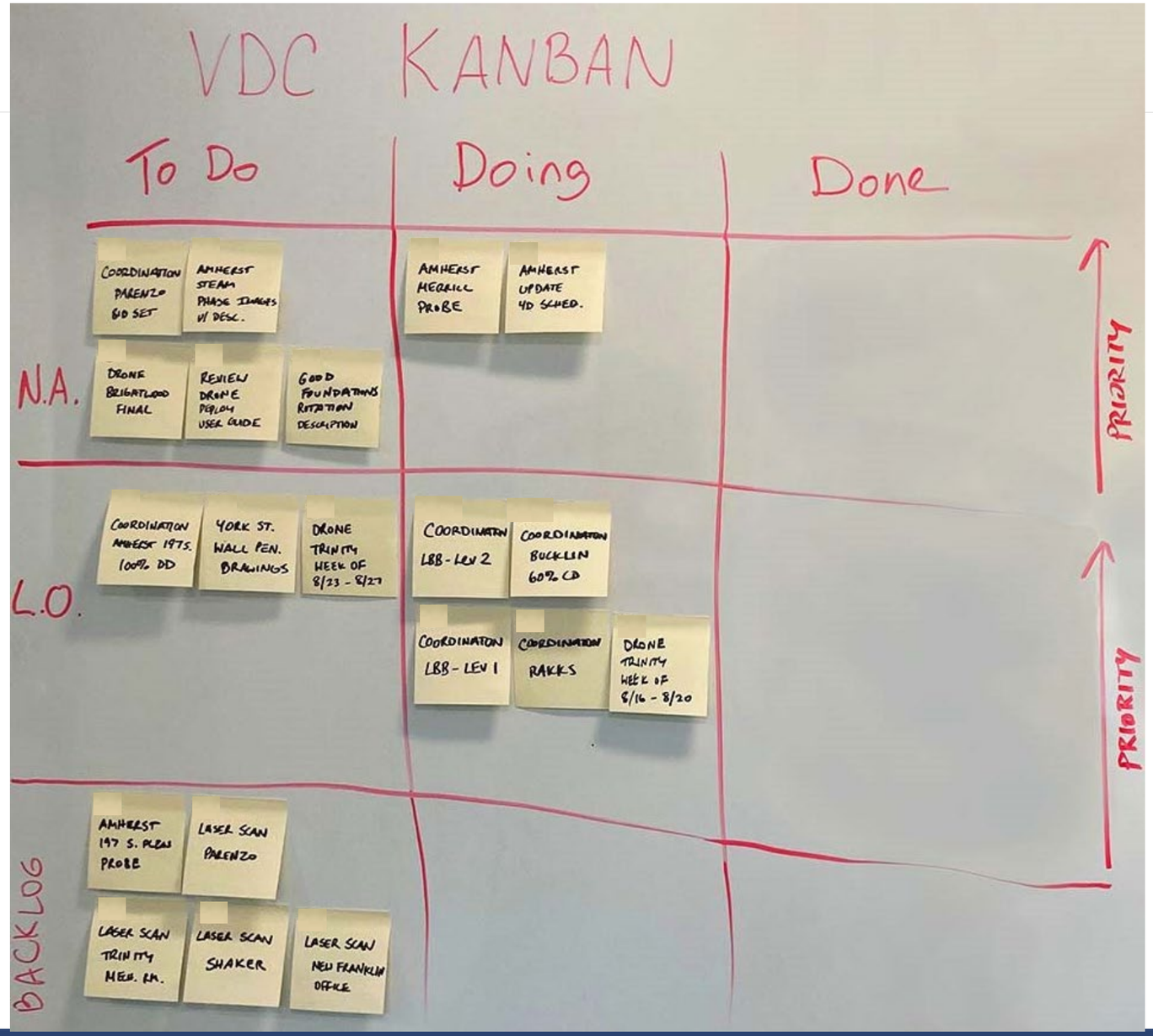

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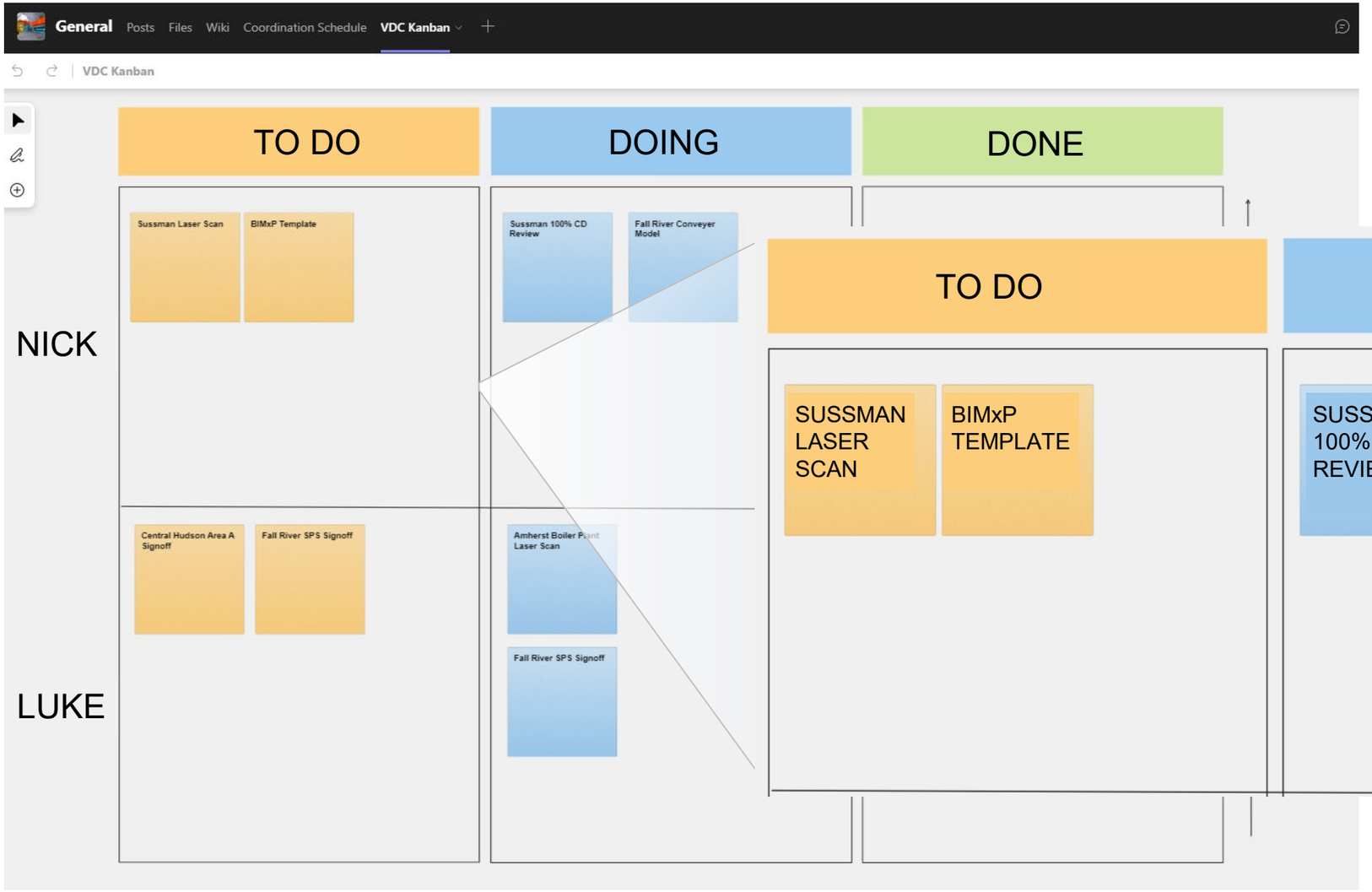
- Easy to interpret
- Clear expectations
- Quick status
- Improved efficiency

△

- Physical stickies/board
- No remote access

VDC Digital Kanban

Microsoft Teams Whiteboard



Using A3 to "Sell" DroneDeploy Software

PLAN

Background

- 2013 – Started flying drones. FAA regulations varied.
- 2015 – First photo mapping attempt @ Yard
- 2016 – Moved to Phantom series drones. Part 107 effective June 2016.
- 2017 – Added 2 drones for Miami jobs
- 2018 – Added drone/pilot for UConn project
- 2020 – Added drone/pilot for NY region
- 2021 – Added 1 drone/2 pilots for VDC department

We're seeing more and more requests for drone use beyond progress/marketing applications. With additional pilots and drone use, we need to take legal and safety measures seriously.

Current Conditions

Currently DOC owns 7 drones. We have 4 licensed pilots, with an additional 5 pending certification.

Region/Job	Equipment	Pilots
New England	1 Phantom, 1 Mini	Kim Bulman
VDC	1 Phantom	Nick Ambrosino, Luke O'Brien
New York	1 Phantom	Devan Gerhlein
Florida	2 Phantoms	*Pending: Wilfred Edjrokinto, Haneef Gardner, Rena Stern*
York Street PS	1 Phantom	*Pending: Ryan Schmitt, Keiran Summers*

Manual/time consuming flights to capture the data, often redoing. In order to calculate volumes, etc, data must be handled by VDC (bottleneck). The drone program has so much more potential than our current application for photo map capturing and backend engineering.

Goal

We want to have a safe and legal company drone program, have the option to add pilots and equipment as necessary in the future, extend application and field autonomy, and use drone data to its full potential.

Analysis

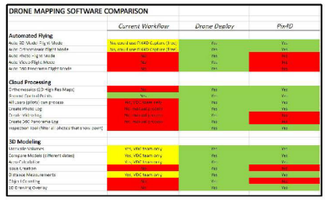
The process is inefficient and time consuming because it filters through one person to manually capture and transfer data to another department, handled by another person, and because it's done manually, it inherently has room for error and hence often requires rework.

The collected data must be handled by the VDC department using multiple software programs which are not habitually used and require additional effort to relearn each step.

We need software in order to grow the drone program legally and safely by maintaining a centralized data collection point.

Proposed Countermeasures

Implement drone mapping/management software to make the process more efficient, eliminate multiple people/steps handling data, resolve human error, and grow the drone program. We tested Drone Deploy and it checks all the boxes.



In order to address legal and safety concerns, we can use Drone Deploy to document flight logs and preflight checklists.

Implementation Plan

Date	Step	People
February	Searched for available software options (Drone Deploy and Pix4D Mapper) and obtained initial pricing information	NA, KB
2/18/21	Start of Free Trial period. Compared to similar software options, checked accuracy and safety features. Tested at UConn and Orleans.	NA, KB, LO
2/25-3/2	Evaluated number of pilots (5: Kim, Devan, Miami, VDC, York) and additional features available (Procore integration and 360 walkthroughs).	NA, KB
3/3/21	Obtained pricing information $25,000/year for 5 pilots	NA, KB
3/12	Present to ELT	NA, KB, RS
3/12-3/19	Re-evaluate/Approve proposal	ELT
3/19	Approval to innovation group	JH
3/26	Decision to Drone Deploy needed before 3/31/21	KB

	QTY	Price	Total
DroneDeploy Enterprise: Gold	1	$10,000	$10,000
Subscriber: Pilots	5	$3,000	$15,000
Premium Integration	1	$2,500	$2,500
		Starter Discount	($2,500)
		Total Software Yearly Cost	**$25,000**

Follow Up

Remaining issues that can be anticipated:

- Consideration of additional features (Procore integration and 360 walkthroughs)
- Redistribution of software fees annually
- Maintaining equipment functionality and safety
- Maintaining FAA licensing (renew every 2 years)
- Allocation of drones and pilots based on project and location
- Additional Pilots will cost an additional $3,000/pilot/year.

DO – CHECK – ACT

A3

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Using A3 to “Sell” DroneDeploy Software

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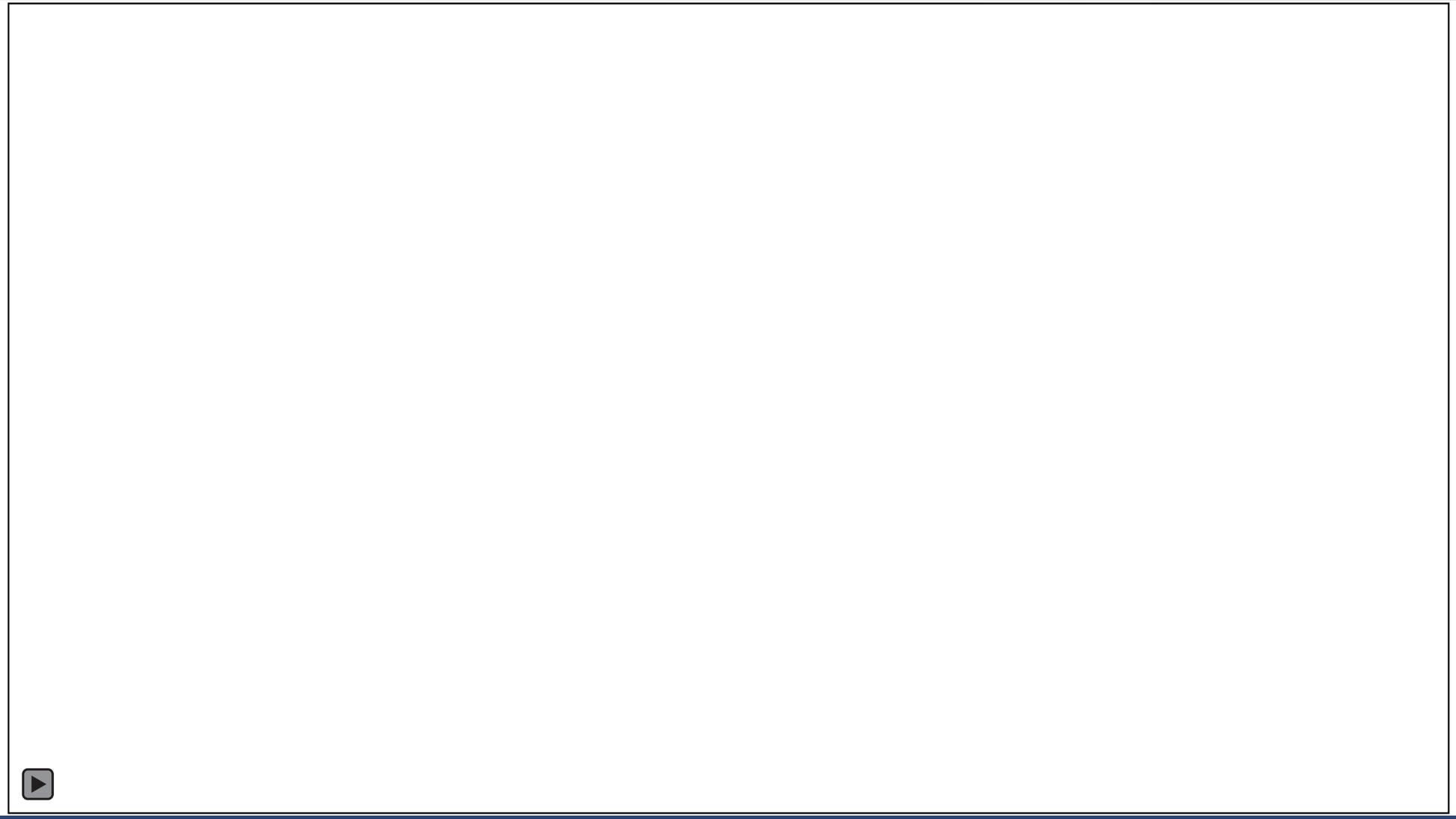
Using A3 to “Sell” DroneDeploy Software



Drone Mapping

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Lean in Planning and Control

Organizing our Scheduling Functions

Scheduling Responsibilities

Jobsite

Consultants

ME!

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Organizing our Scheduling Functions

R Responsible

A Accountable

C Consult

I Inform

Search
“RACI Template”
on the internet

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Organizing our Scheduling Functions

RACI

Roles

Task	President	PX	PM	Superintendent	APM	Asst Superintendent	Field Engineer(s)	Scheduler	Planning and Control
Develop Proposal Schedule Activities and Logic		A	C	C				R	I
Provide Baseline Schedule Activities and Logic		C	A	A	C	C		R	I
Input Baseline Schedule into P6 (or other Scheduling Software)			C	C	I	I		R	I
Submit Baseline Schedule to Owner		A	R	C	I	I	I	C	I

- Responsible — Person working on activity
- Accountable — Person with decision authority
- Consult — Key stakeholder who should be included in decision or work activity
- Inform — Needs to know of decision or action

+

- Easy to interpret
- All in one place

△

- Presents a lot of information

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Our Transformation is Continuous

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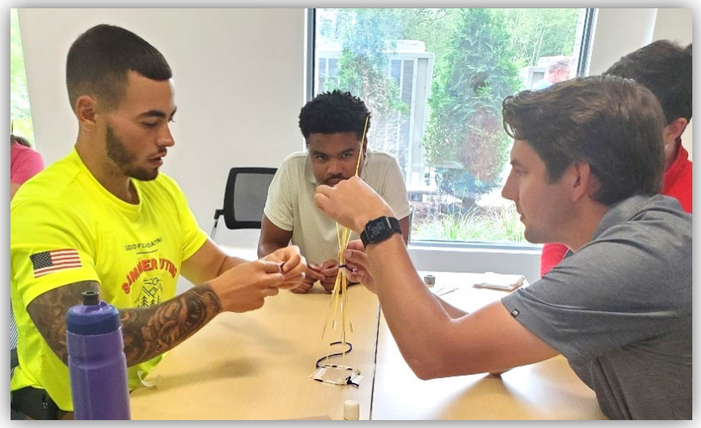
Key Takeaways

Start Simple

Be Flexible



Teamwork

Lean Training

Key Takeaways

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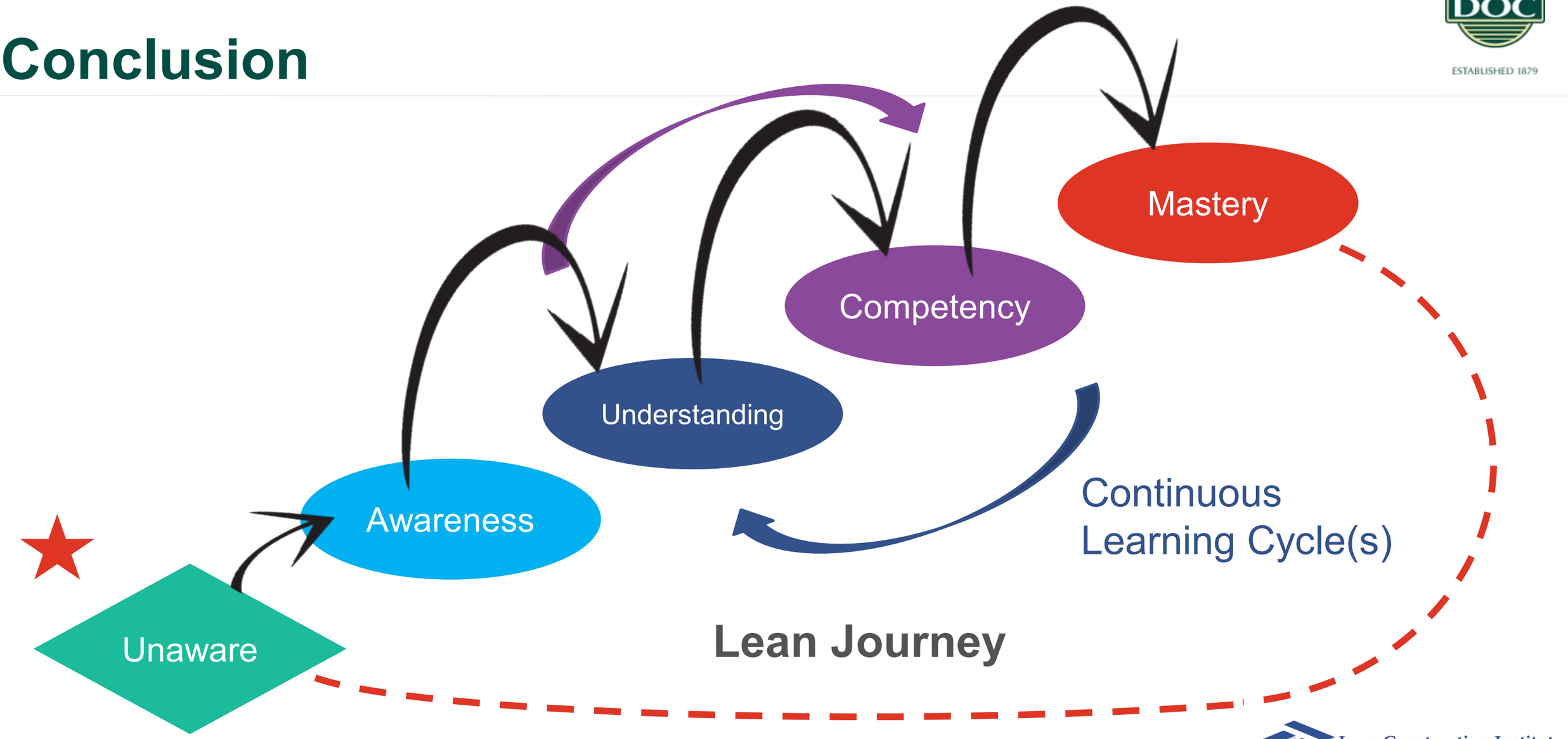
Transforming Design and Construction
COMMUNITIES OF PRACTICE

Conclusion


Mastery
Competency
Understanding
Awareness
Unaware
Continuous
Learning Cycle(s)
Lean Journey

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In the spirit of continuous improvement, we would like to remind you to complete this session's survey! We look forward to receiving your feedback.

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Thank you for attending this presentation. Enjoy the rest of the 24th Annual LCI Congress!

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