LEAD Exchange on Lean Construction Implementation:

Insights and experience

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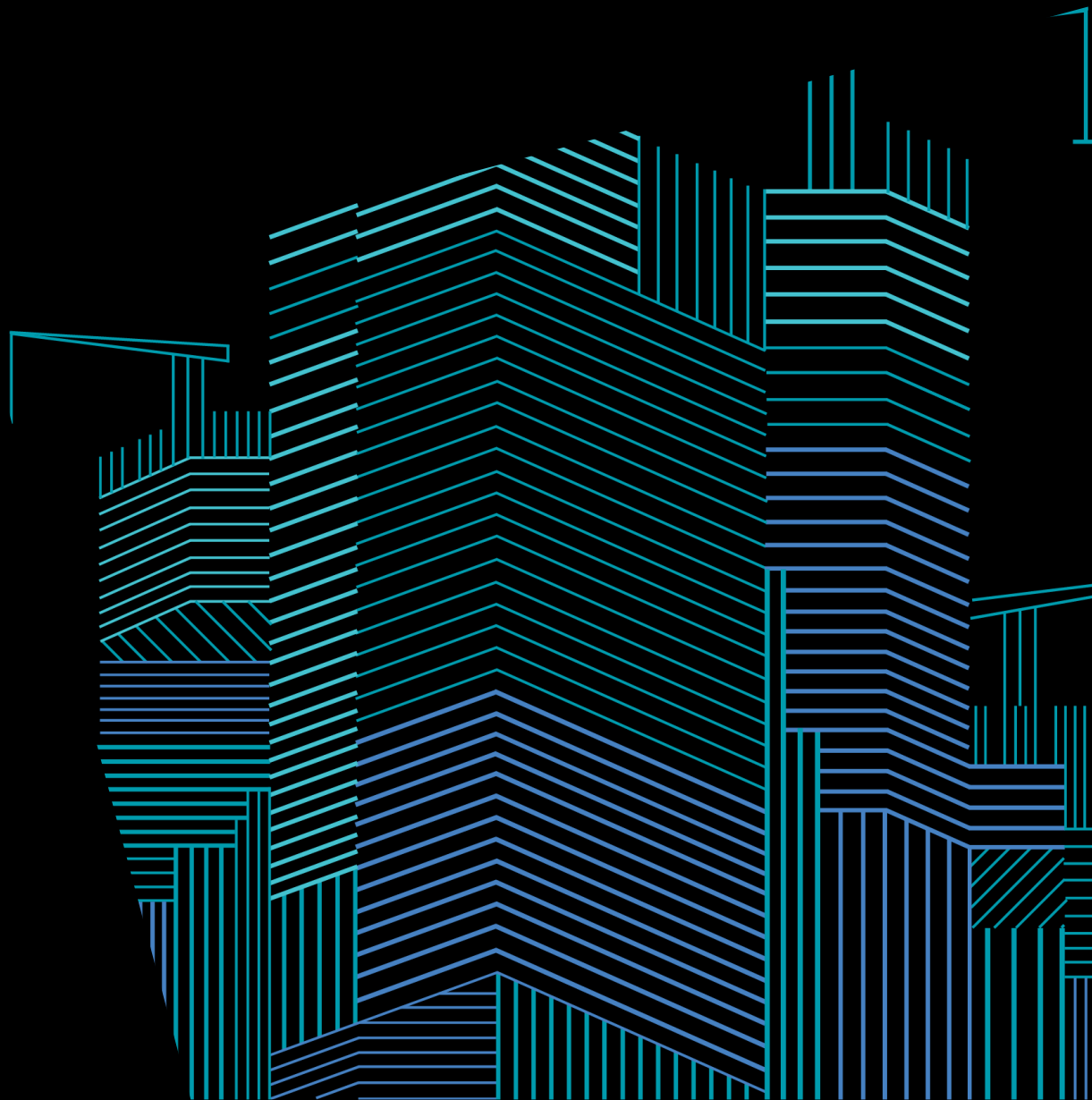


A little bit about myself

Senior Lecturer in Construction Management
Faculty of Architecture, Building and Planning
The University of Melbourne, Australia

former Director, Victoria council Lean Construction ANZ
https://www.leanconstructionanz.org/

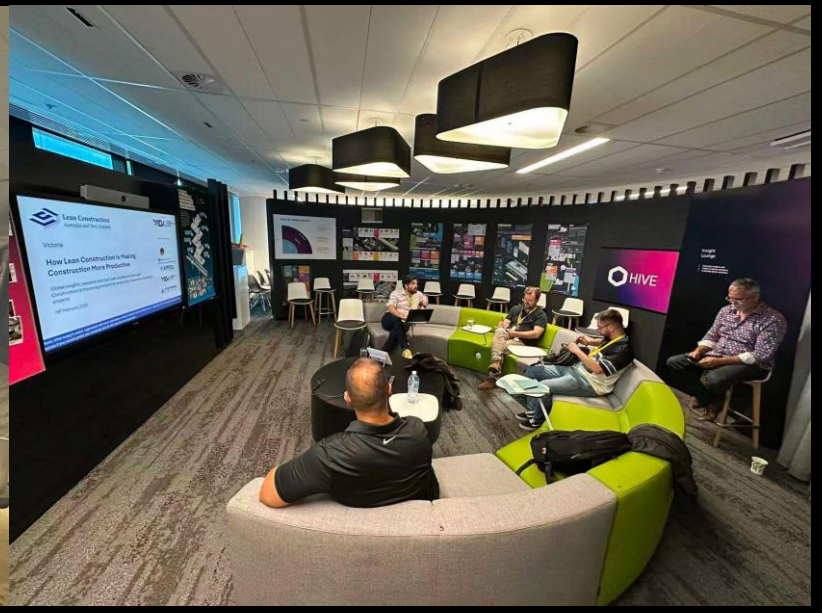
2006 — First encounter

2009-2013 — PhD on Toyota way Under Prof Low Sui Pheng

2016 — Special Diploma about LC@BCAA

2019 - now — Teaching LC at Melbourne Uni

2022 - now — LCANZ



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Finding change in design on your projects hard? Then join this month's Vic CoP to learn how you can make your projects more Agile. Following a great reception in our last CoP event, we are excited to invite Jared Chesterman back for a focused discussion on how to design projects better manage change.
In this presentation, Jared will cover:

- How changing value in different project environments affects efficiency
- How Agile might provide some solutions to these inefficiencies
- What organizations can do to better design project environments to be more productive in changing environments

Thursday, 20 February
4:00 - 5:30 pm
: LXRP's HIVE Insight Lounge, 121 Exhibition Street, Melbourne

This is a limited event so be quick to avoid missing out. Details and tickets here: https://lnkd.in/gks4sCxi

HELPING ORGANISATIONS - "Designing projects to be more agile to change"
eventbrite.com.au

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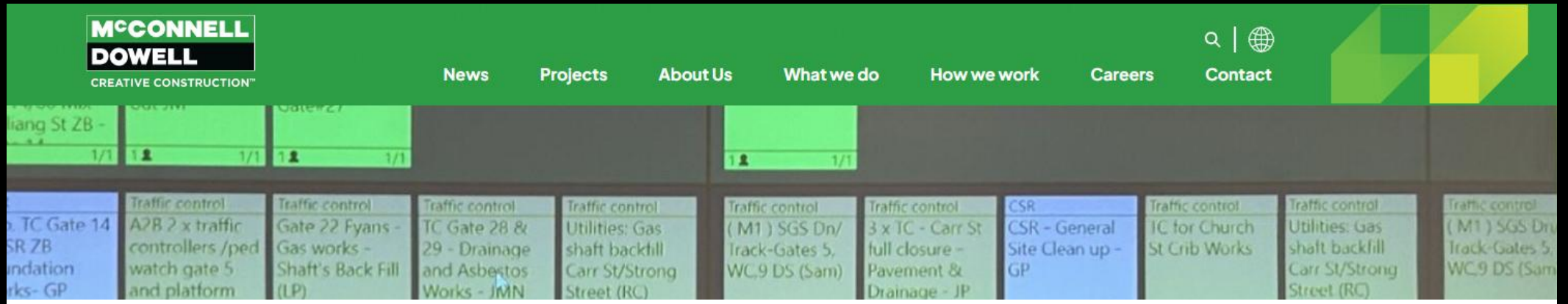
WPA-UOM Research: overview

- **WPA** = Western Programme **Alliance** established to deliver Level Crossing removal projects in Victoria
- **McConnell Dowell** is the main contractor
- WPA-UOM Research kicks off in 2021, pursuing **four** research objectives

- Examine the **status quo** of Last Planner System (LPS) implementation at WPA projects
- What are the **benefits** and **challenges** in terms of LPS implementation
- What are the **critical success factors** of implementing LPS
- Provide **recommendations** for better future roll-out



Digitally-delivered "Last Planner System"

Having used the Last Planner® System on multiple major projects across Australia and New Zealand since 2009, we recently introduced industry to a digitally-delivered version on nine of our major rail infrastructure projects in Victoria.

The Last Planner System, or LPS, is a construction-specific lean practice that was developed in the 90s to tackle the variability that restricts productivity in the dynamic world of construction.

The "last planner" refers to those who understand the work best and oversee its execution. Typically this is the foremen, superintendents or frontline supervisors. LPS is an increasingly popular production planning and control system that engages and empowers these 'last planners' to progressively create better and more reliable production plans. Our customers and design teams also like to get involved and their engagement really improves how we make work ready to deliver.

We used Touchplan® to turn the traditional physical 'planning room', encompassing large wall panels and thousands of sticky notes, into a cloud-based platform. Perfect for the COVID-era of remote collaboration.

When starting, we saw weekly reliability increase by more than 20%. We then asked the University of Melbourne to explore what value digitally-delivered LPS was providing our projects. Their extensive research clearly demonstrated significant process and social benefits that led to improvements in program, cost, safety, quality and sustainability. The teams also felt more empowered and accountable. A great result!

Having developed these project production capabilities, standards and training resources across more than 12 major projects, we continue to build our 'Lean Construction' strategies aimed at continuously improving our productivity and project delivery performance for our customers and the community.

Digital LPS adopted

SHOULD	MASTER PLANNING	Master Schedule, High-level approach to entire project	ORACLE PRIMAVERA P6 / Project
	PHASE PLANNING	High-level approach to phase Typically ~3 months *Right Side of Active Line*	
CAN	MAKE-READY PLANNING	Look ahead plan to remove blockers Typically ~6 weeks *Left side of active line*	Install In Wall Rough-In; Install Exhaust; Firetape & Caulking
WILL	COMMITMENT PLANNING	Weekly Work Plan. Fine tuning and promising for reliability	
DID	DAILY HUDDLES	Daily 15 minute meeting Updating Status, Coordination, and Habits	On Time; Early; Late
LEARN	LEARNING	Continuous Improvement Root Causes, PPC, etc.	Reports; PPC Report

The big room setup

Key findings: implementing LPS

LPS component	What needs to be improved
Last planner	• Engineers/senior engineers produce the plan • Reviewed by supervisors
Master (milestone) planning	• **No updates** on milestone plan after change made in the make-ready plan
Phase Planning	• Whiteboard used for phase planning (Project A) • No Phase planning (Project B)
Look-ahead planning	• 2–3 week as look-ahead window • **Loose** constraint identification
Weekly commitment plan	• **Discontinue** the weekly "promise" session (Project B)
Daily hurdles	• Well executed
PPC and Variance	• No PPC target (Project A) • No continuous improvement mindset

Survey findings: benefits (top 10)

Rank	Key benefits	Mean
1	PC1. Improve planning transparency	4.351
2	SB1. Improved communication and coordination between project participants	4.294
3	PC2. Increased awareness of tasks dependencies	4.194
4	SB2. Improve collaboration and cooperation between project participants	4.147
5	PC3. Improved planning and control reliability	4.135
6	PC4. Improve planning quality	4.054
7	RE1. Better control of work in congested area	4.000
8	PC5. Improve visualisation and visibility of project data (PPC, causes of variance, etc.)	3.968
9	SB3. Improve accountability of project participants	3.935
10	WF1. Improved project effectiveness	3.892

Survey findings: benefits (bottom 10)

Rank	Key benefits	Mean
34	PC15. Increased supplier and subcontractor commitment	3.214
35	SUS1. Enable sustainability and environmental advantages	3.207
36	DM1. Integrated with design schedule and allow better understanding of design	3.188
37	PC16. Shorter meeting duration than traditional projects	3.172
38	OHS1. **Improve OHS** performance	3.097
39	CO1. **Improve cost** performance	3.056
40	QUA1. **Improve work quality** leading to less rework	3.054
41	RE2. Reduce inventory on site	2.935
42	DM2. Enable late selection of design alternatives	2.871
43	TM6. Reduce project duration	2.861

Note: Each benefit is measured on a five-point Likert scale. where 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly agree

Interview findings

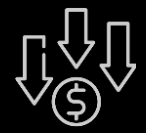
Visibility of planning process and program

Better understanding of program

→ Better Schedule Performance 

Better planning

Sharing resources

→ Better Cost Performance 

Minimising interface

Committed safety and quality person

→ Better OHSQ Performance 

Key findings: challenges

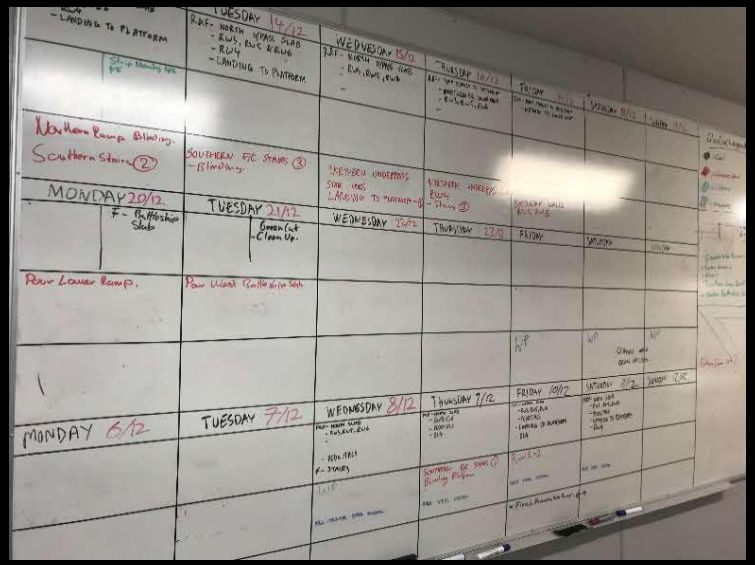
People

- not tech-savvy
- limited buy-ins
- *lack of support from supply chain partners
- *Lack of support from industry, and other stakeholders
- *high staff turnover

** Top ranked challenges from survey*

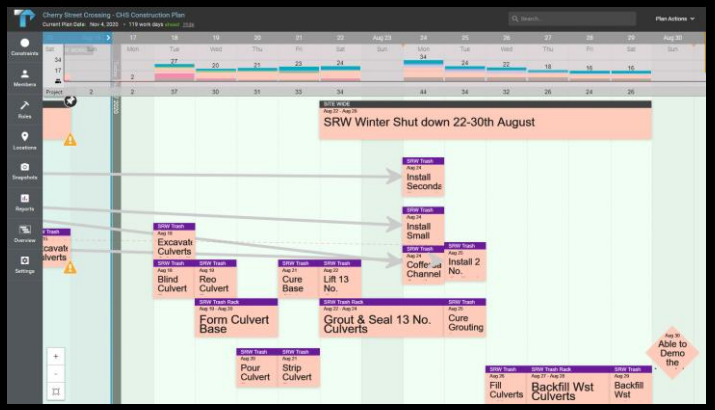
Process

- preference for whiteboard
- *additional planning effort required
- loose use of some LPS components (e.g. PPC)



Technology

- lack of reality awareness
- missing reporting, difficult to report, backtracking

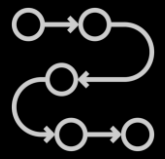


Key findings: critical success factors

People

- **buy-in** and commitment
- **team effort**
- trust
- **champions**

Process



- **support of organisation**
- (more) training and catch-ups
- best practice, workshops and site visits
- support from the continuous improvement (CI) team

Technology

- easy to use
- **shows benefits quickly**
- facilitates behavioural change
- functioning

WPA-UOM Research: Recommendations

1: Setup and preparation

- 1.1 Appoint an LPS champion
- 1.2 Set up a team committed to LPS and get their buy-ins
- 1.3 A step-by-step guide (execution plan)
- 1.4 Set expectations (roles and responsibilities)

2: Training and skills development

- 2.2 Workshops
- 2.1 Provide training based on employee competence level

3: Systematic implementation

- 3.1 Maintain what has been consistently adopted
- 3.2 Find ways to address the least-implemented component
- 3.3 Evaluation framework to assess conformity with elements of LPS

4: Robust structure for communication and conversation

- 4.4 Last planners in clusters
- 4.3 Potentially restructure the meetings
- 4.2 Articulate the communication routines
- 4.1 A guide to how to populate ticket info.

5: Grow together with subcontractors

- 5.1 Transparent
- 5.2 Accessible
- 5.3 Collaborative
- 5.4 Supportive
- 5.5 Be firm

6: Invest in digital construction process

- 6.3 A guide to integration of TP and Propeller
- 6.2 A third screen in VMC?
- 6.1 Predetermined activities from WBS

7: "Collaborative Planning" as clause in contract

7.1 Parties jointly develop the schedule, the target cost, project goals, and definitions.

7.2 The core group engages in and meets regularly.

7.3 The team employs pull planning to develop the schedule, collaboratively developing weekly work plans that are used to track progress.

Experience with the contractor delivering Meta's data centre in Singapore

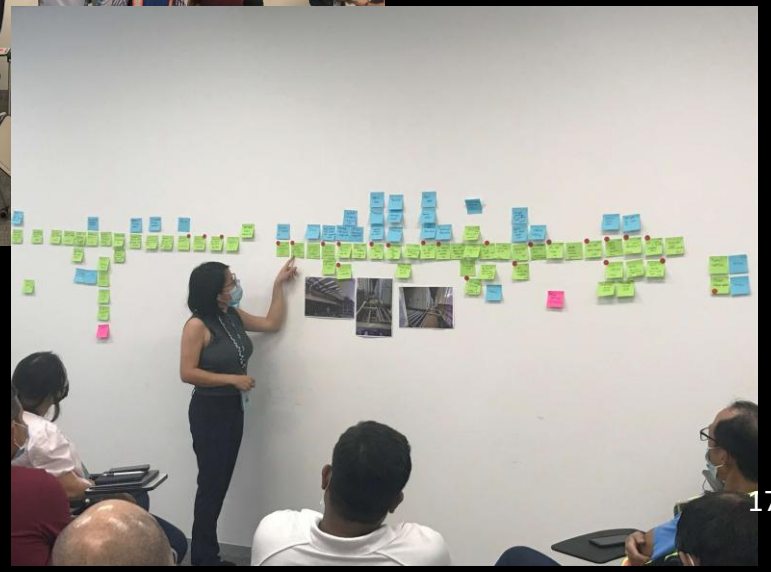
- Engaged to provide lean training
- Large scale, complex project, with
- Extensive DfMA
- Strong leadership commitment to Lean, productivity improvement, and innovation
- Unable to share more due to NDA signed
- But…

What was covered during the training

- Many are aware of different types of muda/waste (non-value adding activities)
- Encourage more **regular** gemba walk in addition to safety and progress orientated, to consider theme of **productivity and efficiency**
- Record observations, engage conversation with field crew, initiate root causes analysis, and learning

What was covered

- Waste/ Gemba walk
- Value stream mapping
- Last planner System
- Variability & Interdependence



What was covered

- Quickly realised the team had done "**process mapping**" before
- The length of total lead time (LT) shocked everyone
- Acknowledged the value-adding activities are few, agreed many are non-value adding but supportive
- Excited about raising "issues" (see blue post-it)
- Never short of good ideas about resolving issues, but unsure what is next after this exercise?
- Good insights on "opportunities" (see pink post-it)
- Support/resources are required to leverage the opportunities
- …

What was covered

Waste/ Gemba walk

Value stream mapping

Last planner System

Variability & Interdependence

- Discussed who shall be last planner
- Introduced the LPS system
- Exercised the pull planning method

90%

No or “sort of” a process to systematically resolve constraints for work planned in 3-6 weeks' time

60%+

No process in place to collaboratively do look-ahead planning

Key takeaway

- It all starts with leadership commitment - This is the hardest part
- Be clear about *why* your company/project is implementing lean
- Never forget the fundamentals of Lean construction （不忘初心）:
  Value, Flow, Waste reduction, Continuous improvement, respect for people
- The easy part is the lean tools/practices (干就完了）
- Any lean practices can work: LPS, Takt, Visual management, VSM, 5S, JIT and many others
- Adopt and adapt the lean practices in your contexts
- Procedure + (digital) Tool + Training/coaching

Thank you for listening

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