THE CASE FOR LEAN CONSTRUCTION

THE ARDMAC STORY

Presentation Overview

Introduction

Why Lean

- Educating Ourselves

What is Lean

- Core Lean Principles
- Key Lean Leadership Requirements
- Lean Practice Requirements

Last Planner

- Last Planner System
- Completed Weekly Work Plan
- Variance Count
- On Track/Late Missed Activity
- Overall Performance To Date
- Constraint Log
- Last Planner Success

Integrated Project Delivery (IPD)

- Client drivers for IPD
- Output of IPD
- Benefits of IPD

Barriers and Resistance to Change

- Barrier/Resistance

The Future of Ardmac

- The Future of Ardmac

Questions & Answers

WHO WE ARE

An international construction specialist that delivers complex high value workspaces and technical environments.

ARDMAC IN NUMBERS

Ardmac around the world

Four main offices

Dublin Manchester Brussels Craigavon

Ardmac in numbers

300+
The number of people working at Ardmac

65
The number of people on the Ardmac team for over 10 years

750
The number of projects completed the past 5 years

5,000+
The number of projects completed since 1977

4
The number of years in a row we have won the RoSPA Order of Distinction Award

18
The number of years in a row that we've won the RoSPA Gold Award for Health and Safety

200,000 m²
The number of m² of data centre space we've built in the last three years

300,000 m²
The amount of cleanroom space delivered in the last 6 years

Four main offices

Dublin
Manchester
Brussels
Craigavon

OUR BUSINESS

We work in four key areas:

FIT OUT

CLEANROOMS

DATA CENTRES

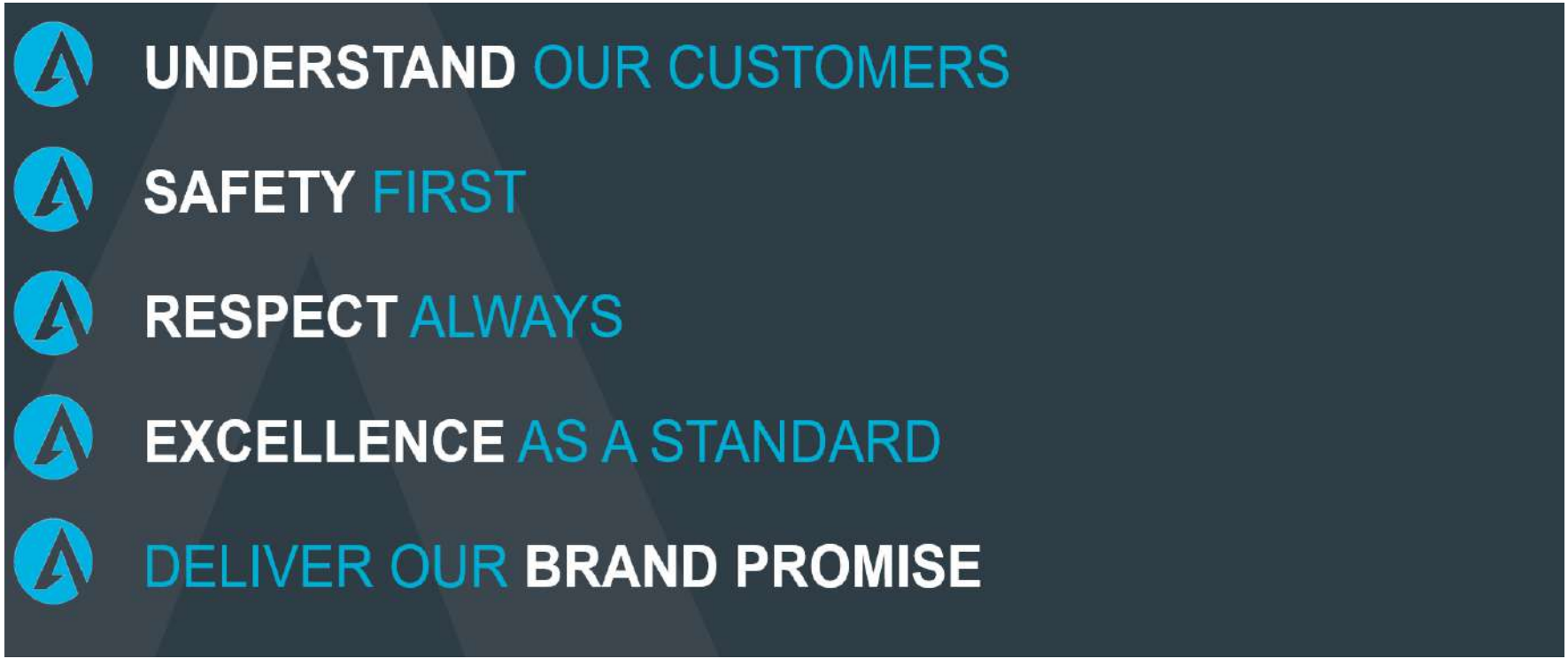
REFURBISHMENT & CONSTRUCTION

SOME OF OUR CLIENTS

OUR MANTRA

Excellence in everything we do

OUR GUIDING PRINCIPLES



Why Lean?

Productivity, Efficiency, Improved Planning, Client demand & Development of our Guiding principles

The CPD Standards Office
CPD PROVIDER: 21536
2017 - 2019
www.cpdstandards.com

Accredited cpd Course

EDUCATING OURSELVES

- LCI events
- Green & Yellow belt training
- Research
- Help from service providers

What is Lean?

Core Principles, Leadership & Practice Requirements

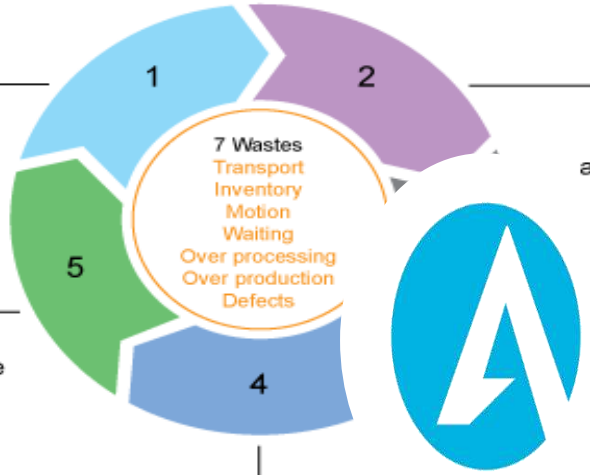
WHAT IS LEAN?

"Lean is a business strategy based on satisfying the customer by delivering quality products and services that are just what the customer needs; when and where the customer needs them; in the amount required; at the right price; whilst using the minimum of materials, equipment, space, labour and time."

What Lean means to Ardmac:

- ✓ Working together
- ✓ Working Smarter
- ✓ Reducing the 8 wastes
- ✓ Removing obstacles that prevent workflow
- ✓ Working safely
- ✓ Getting it "Right First Time"
- ✓ Always looking to do it better

5 CORE LEAN PRINCIPLES



Specify Value

Define **value** from the customers perspective and express value in terms of a specific product or service

Map the Value Stream

Map all of the steps...value added and non-value added...that bring a product or service to the customer

Work to Perfection

The complete elimination of waste so all activities create value for the customer by breakthrough and **continuous improvement** projects

Establish Flow

ntinuous **flow** of products, s and information from end to end through the process

Implement Pull

Nothi[illegible] oy the upstream process until the downstream customer signals the need, actual demand **pulls** product/service through the value stream

KEY LEAN LEADERSHIP REQUIREMENTS

- Understand the philosophy of lean and lean principles.
- Demonstrate their commitment, as lean integration can take 5-10+ years.
- Demonstrate their willingness to change and more importantly their ability to change.
- Create a learning culture where collaboration and innovation are encouraged.
- Resource the lean effort with a lean project team or a lean champion who works at a senior level and reports to the boards.
- Include lean policies as part of the organisation strategy.
- Leaders become coaches.
- Ideally focus on lean tools when the above steps are achieved.

LEAN PRACTICE REQUIREMENTS

"…Drivers for change are now internal & external but are driven from Inside our organisation…"

Lean practice requires a cultural shift:

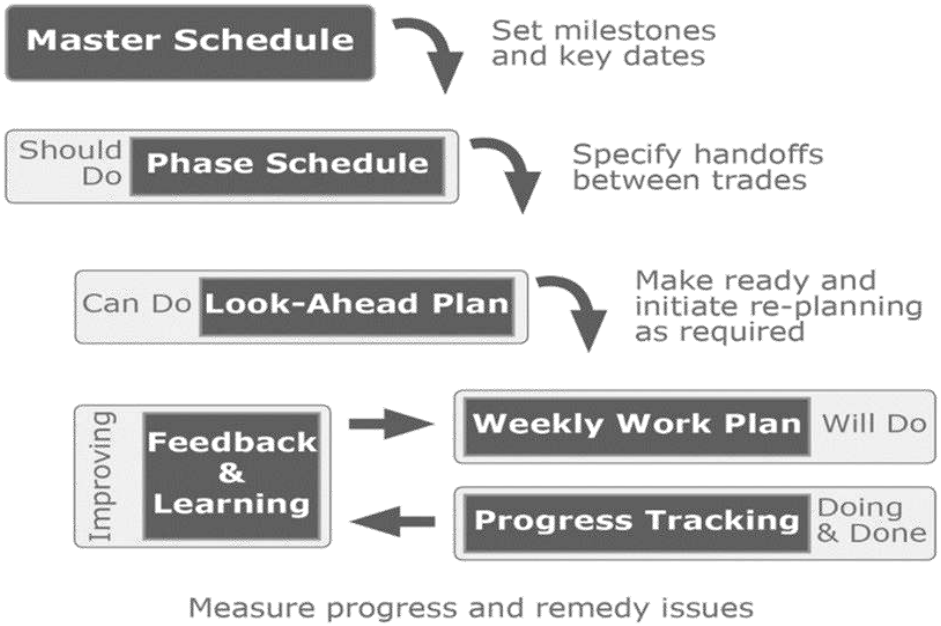
- 90% People
- 10% Tools

Last Planner

System, Work Plan & Successes

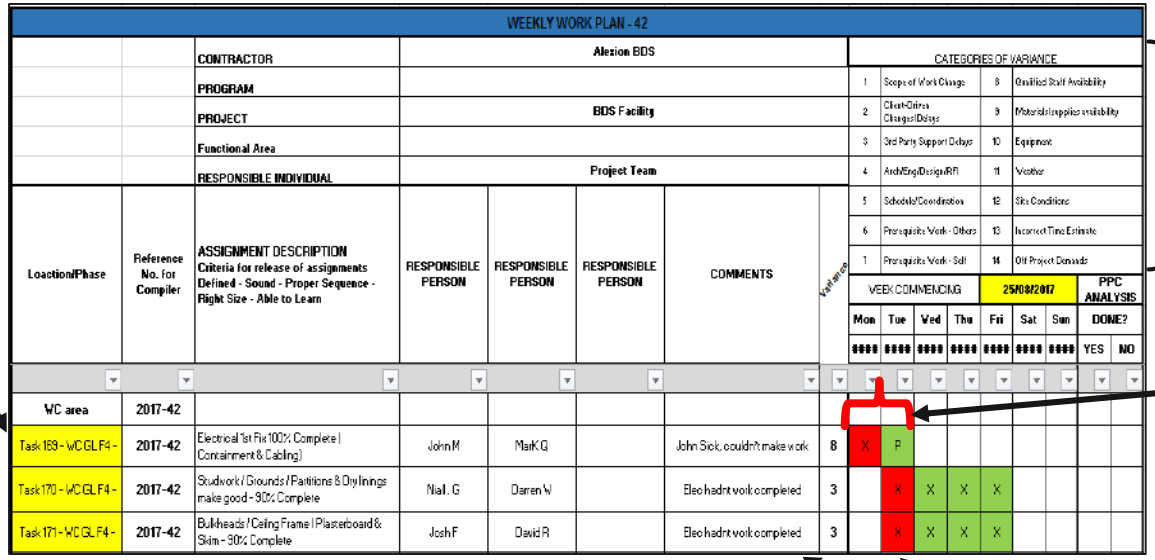
Last Planner

LAST PLANNER SYSTEM



- **Weekly Work Planning**
- **Weekly Planning Coordination**
- **Weekly Constraint Identification**
- **Daily Huddle**
- **Weekly Review**

COMPLETED WEEKLY WORK PLAN



WEEKLY WORK PLAN - 42

CONTRACTOR	Alexion BDS
PROGRAM	
PROJECT	BDS Facility
Functional Area	
RESPONSIBLE INDIVIDUAL	Project Team

CATEGORIES OF VARIANCE

1	Scope of Work Change	8	Qualified Staff Availability
2	Client-Driven Changes/Delays	9	Materials/supplies availability
3	3rd Party Support Delays	10	Equipment
4	Arch/Eng/Design/RFI	11	Weather
5	Schedule/Coordination	12	Site Conditions
6	Prerequisite Work - Others	13	Incorrect Time Estimate
7	Prerequisite Work - Self	14	Off Project Demands

Loaction/Phase	Reference No. for Compiler	ASSIGNMENT DESCRIPTION Criteria for release of assignments Defined - Sound - Proper Sequence - Right Size - Able to Learn	RESPONSIBLE PERSON	RESPONSIBLE PERSON	RESPONSIBLE PERSON	COMMENTS	Variance	WEEK COMMENCING 25/08/2017 Mon	Tue	Wed	Thu	Fri	Sat	Sun	PPC ANALYSIS DONE? YES	NO
								####	####	####	####	####	####	####		
WC area	2017-42															
Task 169 - WC GLF4 -	2017-42	Electrical 1st Fix 100% Complete (Containment & Cabling)	John M	Mark G		John Sick, couldn't make work	8	X	P							
Task 170 - WC GLF4 -	2017-42	Studwork / Grounds / Partitions & Dry linings make good - 90% Complete	Niall . G	Darren W		Elec hadnt work completed	3		X	X	X	X				
Task 171 - WC GLF4 -	2017-42	Bulkheads / Ceiling Frame / Plasterboard & Skim - 90% Complete	Josh F	David R		Elec hadnt work completed	3		X	X	X	X				

Elec didn't finish task on Monday due to John being sick, This meant the next task couldn't start on time.

Tasks go red, this list of Variances explains why.

X in red because task was due to finish that day, it didn't so it goes as incomplete.
P = Task is pushed or an unplanned event occurs. In this case task got pushed to the Tue and was completed.

Variances – Reasons that tasks didn't happen or targets weren't reached for the week.

Delayed starting works, Elec 1st fix wasn't finished on time.

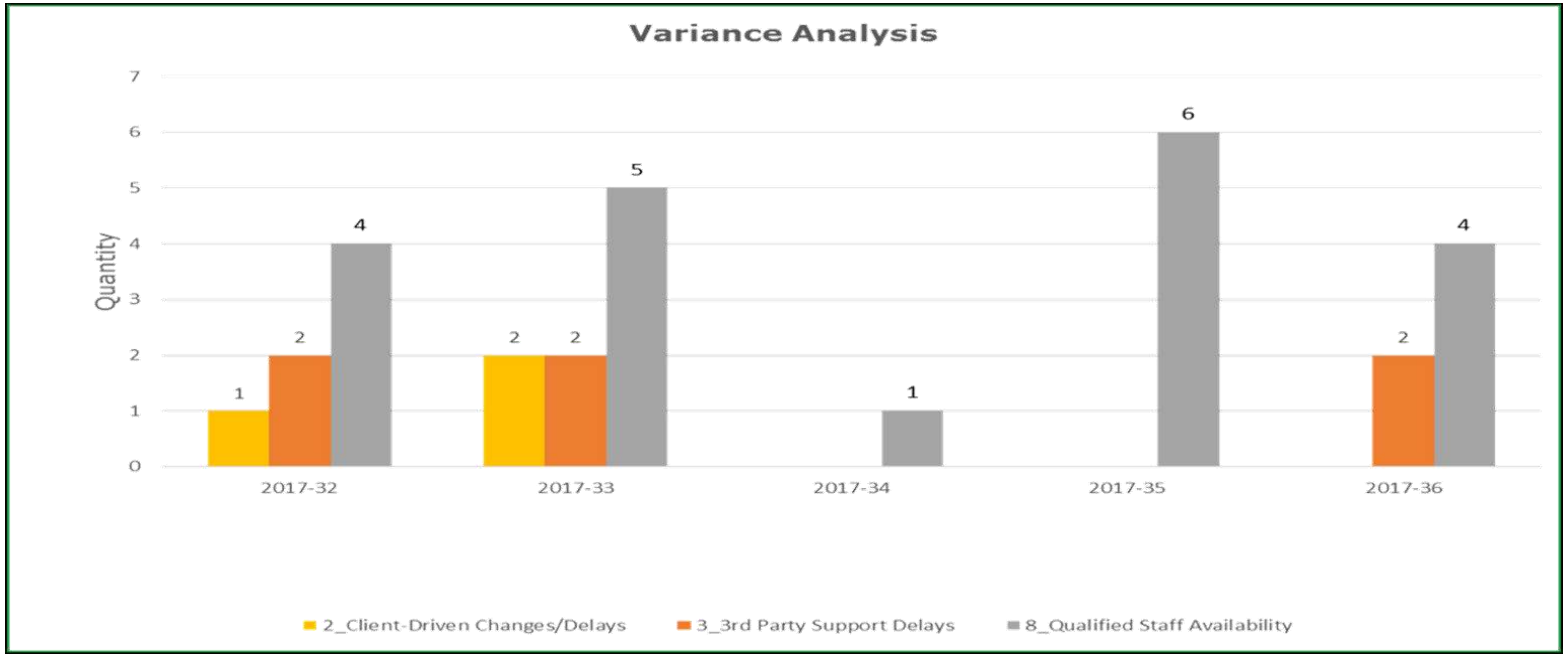
VARIANCE COUNT

Count of Variance Status					
Week No	On Track	Early	Late	Miss	Grand Total
2017-32	73.17%	3.66%	3.66%	19.51%	100.00%
2017-33	69.09%	0.00%	10.00%	20.91%	100.00%
2017-34	75.70%	3.74%	8.41%	12.15%	100.00%
2017-35	64.71%	0.84%	13.45%	21.01%	100.00%
2017-36	70.18%	0.88%	9.65%	19.30%	100.00%
Grand Total	**70.30%**	**1.69%**	**9.40%**	**18.61%**	**100.00%**

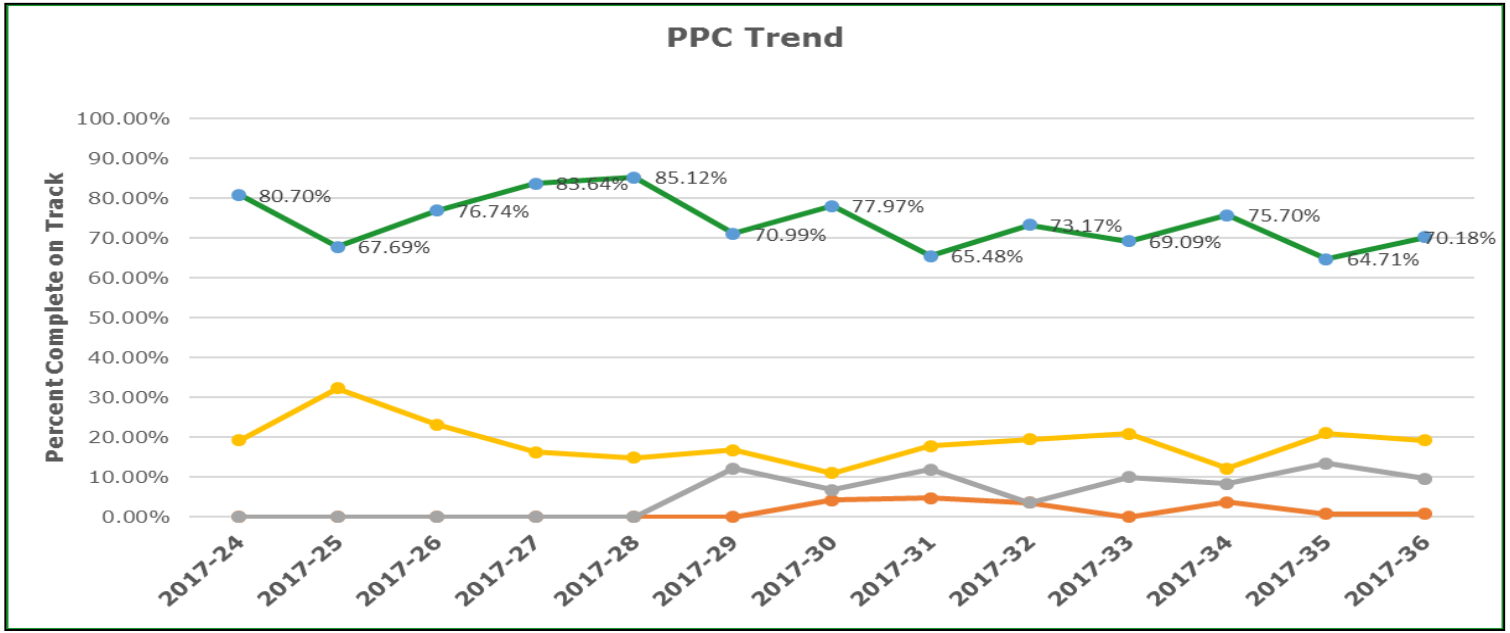
VARIANCE COUNT

Count of Variance					
Week No	Early	Late	Miss	On Track	Grand Total
2017-32	3	3	16	60	82
2017-33		11	23	76	110
2017-34	4	9	13	81	107
2017-35	1	16	25	77	119
2017-36	1	11	22	80	114
Grand Total	**9**	**50**	**99**	**374**	**532**

ON TRACK LATE/MISSED ACTIVITIES



OVERALL PERFORMANCE TO DATE



CONSTRAINT LOG

Comments regards to who the issue lies with, what is the constraint.

Jason Casey picked up on the issue at week 42.1 (Monday)

RFI number if applicable, ref. email to responsible person requesting information.

	CONSTRAINT LOG		To add new name to this list, open 'Data Sheet'				Date Format:	Year	Work Week No. (1-52)		No. day in week (1-7)		
								17	01		.1		
Cotn.s	CONSTRAINT DESCRIPTION	Comments	INITIATOR (Person who identifies issue)	Dept	Work week DATE IDENTIFIED	Work week Date Need	OWNER (Person responsible to solve)	Company	Location/Phase	RFI# (if applicable)	Work Week DATE PROMISED	Work week DATE COMPLETED	Action Required
1	Task 177 - Delay on Sensor & Controls	Sensors & Controls not ordered yet, design delay by client.	Casey, Jason	Arch.	42.1	48.1	O' Connell, Brendan	PGGroup	Level 1	RFI #106	47.2	TBC	Design choice finalised
2	Task 176 - Grilles & Diffusers	Subbie hasn't ordered materials yet, 4 week lead time.	Casey, Jason	Arch.	42.1	48.1	Griffin, John	Mech Inc.	Level 3	RFI #119	46.5	TBC	Order materials in coming week
3	Task 174 - IPS Joinery 1st fix (Incl Vanity)	Contractor hasn't nominated suitable subbie for works yet, need to be resolved.	Casey, Jason	Arch.	42.1	47.2	Casey, Jason	Ardmac	Warehouse	RFI #79	46.1	TBC	Nominated & award contract to subbie

Action that is needed to complete/close the Constraint.

47.2 Is the date in the schedule to be fitted. Needs to be resolved before this.

46.1 Work Week promised will be confirmed when Owner agrees to a date.

Brief description & Task No.

LAST PLANNER SUCCESSES

WITH LAST PLANNER V WITHOUT LAST PLANNER	
SAFETY	Zero first aids or near misses on the last planner project
DEFECTS PER €50K	Reduced from 9 defects at client walkdown to 3.4
LABOUR RATIO ACTUAL:BUDGET	Reduced labour to budget ratio (circa 10% reduction)
MARGIN ACTUAL:BUDGET	Margin Improvement on project with last planner
UNPLANNED STOPPAGES PER €50K	Unplanned stoppages on project with last planner were less than 2 per €50K works complete
TEAM ETHOS	Subjectively more Positive on Project 2 with less Frustration
SCHEDULE	Project complete 3 days early v 2 weeks post PC target date

Integrated Project Dellivery (IPD)

New Challenge, new opportunity

CLIENT DRIVERS FOR IPD

- Increased client value.
- Early specialist knowledge at project design stage.
- Focus on overall improvement integrating processes, tools and people in one system.
- Better working relationships
- Creates contractor buy in to target value delivery through incentivisation.
- Improvement across all key measurable metrics (Safety, Quality, Cost, Schedule).
- Reduces waste

CLIENT DRIVERS FOR IPD

- Team of project constituencies being open and collaborative.
- Process is concurrent, project life cycle orientated, collaborative with shared information.
- Collectively shared and managed risk.
- Performance and value base compensation.
- Technology is object orientated, data is centralised and a shared model is in place

BENEFITS FOR IPD

- Reduced variation and claims.
- Elimination of waste and duplication
- Transparency and trust
- Integrated team ethos leave project delivery easier.
- Contractor incentive when target achieved.
- Improvements in Key measurable metrics (Safety, Quality, Cost, Schedule).
- Long term relationships gained

Barriers and Resistance to Change

BARRIERS/RESISTANCE

The barriers we have encountered when attempting to reduce waste include:

- ✓ Current contracts don't support lean practices.
- ✓ The culture in (parts of) the Construction Industry.
- ✓ The classic list of seven wastes in not fully relevant for construction.
- ✓ Projects are quick, complex and uncertain so waste reduction is complex.
- ✓ The low degree of stability and repetitiveness prevents flow
- ✓ Short term relationships and fragmented supply chain
- ✓ The role of the Construction Manager

Future for Ardmac

Excellence in Everything We Do

THE FUTURE FOR ARDMAC

Lean Strategy			
Task	**Plan Complete**	**Status**	**Comment**
Lean belts training	Ongoing	Ongoing	23 Yellow belt/2 Green Belt complete
Lean Governance Team	Mar-18	Closed	Team in place
Lessons learned to be standarised	May-18	Open	On track. New SOP to be completed. Lessons Learned 'yammer' group created
Direct Observation/Time in Motion	Ongoing	Ongoing	2 Trials complete. Software trials ongoing
Lean Plus funding	Mar-18	Ongoing	Decision due next week
Rapid problem solving Webinar	Extra	Closed	Only 5 attendees. Webinar on My ardmac
Ardmac- Our Lean Journey webinar	May-18	Open	24th May 2018 3pm
Construction Industry awards Submittal	Apr-18	Closed	Sucessful shorlisted for innovation award on our Lean Strategy - Awards 14th June

THE FUTURE FOR ARDMAC

- Educate all our staff – Leaders as coaches
- 5 year Lean strategy in place
- Last Planner rolled out across the organisation
- Resources put in place to aid measurement and development.
- Integration of lean culture across the organisation.
- IPD development.
- Shingo model implementation as part of our strategy.

Q&A

THANK YOU

Contact LCI

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