“Ashghal’s lean construction initiative”

23rd October 2019
Ahmad al Ansari is Head of the President’s Technical Office in Ashghal, the Public Works Authority (PWA). His previous roles include Head of Planning, Design & Contracts for the Qatar Olympic Committee on projects for the 2006 Games and as Head of Water Projects for the Ministry of Electricity and Water.

Jenefer Alam is Associate Director for Parsons Brinckerhoff, working within Ashghal’s Roads Projects Department. She has been instrumental in the embedding of Constructing Excellence and Lean within the programme. Jenefer has diverse civil engineering experience, including construction, design, tendering, project controls, governance systems, innovation and Lean. She is a core member of the Constructing Excellence in Qatar team and is heading the Lean and enhanced contracts programme within Ashghal.

Richard O’Connor is a leading practitioner in change management, lean and continuous improvement. He has helped over 100 companies in construction and manufacturing to realise impressive improvements in quality, delivery and cost performance. In Ashghal he is responsible for the training and upskilling programme to equip contractors, consultants and clients with the skills to deploy lean construction to improve performance.

Don Ward heads the not-for-profit Constructing Excellence in Qatar which has been a partnership between Ashghal and the UK organisation Constructing Excellence. He has worked on best practice in Qatar construction for five years.
AGENDA:

Welcome and introductions

Main speakers:
- Ahmad al Ansari, Technical Office, Ashghal
- Jenefer Alam, WSP/Ashghal
- Richard O’Connor, WSP/Ashghal
- Don Ward, Constructing Excellence in Qatar

Q&A and panel discussion

Ashghal’s lean construction initiative
Recognizing Lean Transformation

Lean Construction Practice & Implementation at Public Works Authority

Presented by
Ahmad Ali Al Ansari

Doha 23rd October 2019
ASHGHAL’S Corporate Strategy 2018-2022

OUR VISION

“Excellence in delivering and managing efficient sustainable infrastructure”

OUR MISSION

“Continuously enhancing customer satisfaction through leading project and asset management services and solutions”

OUR STRATEGIC THEMES

Health and Safety

Deliver Excellence

Develop Capabilities

Customers and Stakeholders

OUR CORPORATE OBJECTIVES

C1 Enhance our health and safety performance
C2 Ensure on time delivery with quality
C3 Effectively integrate new assets
C4 Optimise and manage cost
C5 Improve quality management performance
C6 Improved sustainability and recycling
C7 Increase Qatarisation and develop our staff
C8 Increase Qatari involvement in our supply chain
C9 Embed leading practices across Ashghal
C10 Enhance customer and stakeholder satisfaction
Lean Construction

- A design and execution methodology to minimize Waste of processes, materials and effort in order to generate the maximum Value

- Real Value is not the Low Bid on a High Cost Design but it is the low True cost on the Right Design

Eric Ahlstrom
Following assessment and evaluation of current design & construction processes, the following wastes were observed:

- Over production & building ahead of time
- Waiting time for next operation
- Process waste and/or over-processing
- Inappropriate operations
- Material stocking and inventory
- Unnecessary motions and actions
- Defects and rework
- Unused human capital
• Better cost control, where money will only be allocated when needed and spent where applicable at the right time.

• Human & Plant Resource Control; employ and hire only when required and needed. Release after completion.

• Operation Control; procure and build just in time. Select best construction and procurement method that best fit and go in line with business strategies.

• Information Control; use efficient software tools, at both design and construction stages, and report on time (continuous monitoring & control).
What have we done?

Tackled waste through lean enhancement of the following:

**Design & Construction Operations**
- Value & Value Stream
- Team Collaboration & Process Flow
- Control Changes, Improve Performance & Efficiency through Technology

**Contract Management & Commercial Terms**
- Risk Allocation and Incentive Scheme (KPI’s)
- Pre-qualification & Selection Criteria
- Procurement Strategy – Lean Procurement

**Project Organization**
Evaluation of Current Design & Construction Processes

Project Development Process – System Design

Start
Design Brief
Design Development
Production Information
Tender
Construction
DLP & Final Completion

Isolation Line

Can we establish better
& stronger relationship
between Design & Construction?
Redevelopment & Strategic Change Proposal

Lean Process Modelling for Integrated Design & Construction

End User

External Stakeholders

PWA Planning and Design Team

- Start
- Design Brief
- Design Development
- Production Information
- Tender
- Construction
- Hand-over & DLP

PWA Construction Team

Professional Expertise

Specialist Suppliers & Contractors
Thank You

Ahmad Al Ansari
aalansari2@ashghhal.gov.qa
Ashghal - Constructing Excellence CPD Event

Enhanced Project Delivery

Jenefer Alam
LOCAL ROADS AND DRAINAGE PROGRAMME

Outline Scope

- 260+ Delivery Teams
- 80+ General Engineering Consultants
- 77B QAR, 21B USD Contractors
GLOBAL CONSTRUCTION STATS
Why Enhancements?

- Global construction industry productivity improvement = **circa 1%** over two decades,
  - manufacturing=**3.6%** and
  - total world economy=**2.8%** (McKinsey GI, 2017)

- If productivity equalized with world economy,
  - sector’s value would increase by circa $1.6 trillion,

- UK’s 10 largest contractors on turnover of £31B,
  - made a combined **margin <0.5%**, 
  - targets were a min 2% (Building’s Contractor Survey 2018).
CONSTRUCTION ENHANCEMENT JOURNEY 2017-2019

- 13 Contracts awarded under enhancements – 9 in construction
- #4 phase 1, and #1 phase 2 training complete
- 200+ personnel taken through Lean training
- First series of benefits case studies

- **January 2017**
  - A will to increase productivity

- **February 2017**
  - Task Force Established

- **March 2017**
  - Lean Pilot Projects

- **December 2018**
  - First 5 Contracts Award Lean Workshop for 95+

- **March 2018**
  - Enhanced Contracts Launch

- **April – August 2017**
  - Tangible Evidences Present to Ashghal President

- **February 2019**
  - Lean Practitioner Training

- **March 2019**
  - Ashghal’s Industry Briefing and Survey

- **April-Present**
  - Ongoing Project Support
• Projects under the new “Enhanced Delivery” requirements

• Key differences in specification
  1. Phased zonal delivery
  2. New “Look & Feel”
  3. Improved Public Relations
  4. Disruption Management and Site housekeeping
  5. **Lean Construction**
  6. New Management Plans
  7. Enhanced Programming & Planning
  8. Additional Key Staff to support the above

• Pre-mobilisation period engagement from award to advance payment
Minimum Tools to apply

- Collaborative Planning (Pull production planning);
- Visual Management;
- Implementation of 5S to workplace organisation;
- Continual improvement
  - Quality
  - H&S
  - Productivity
  - Predictability of delivery
  - Best practice implementation
  - Elimination of wasted efforts

Minimum 2 Lean Implementation Leads
LEAN CONSTRUCTION
Growing Industry Awareness & Engagement

10 Industry Presentations in conjunction with Professional Institutes and Academia:

1. CIOB,
2. CIHT,
3. ICE,
4. Qatar Big 5 2018,
5. Qatar University,
6. Constructing Excellence 2018 & 2019,
7. Ashghal Briefings
8. Ashghal Industry Events 2018 & 2019
9. Supported Qatar Uni Masters Research

➢ Raising awareness of Lean
➢ Engaging industry on Ashghal’s vision
➢ Providing platform for discussions
➢ Growing clarity and confidence in our delivery strategy

Attended by approx. 1900+ across industry
Enhancement Support Plan

**Award Letter**
- Readiness checks every 4 weeks
- Review Performance Centre use
- Support with Lean Plan
- Support collaborative planning
- Track mobilization plan
- Lean half day workshop
- KPI, PR workshop

**Mobilisation**
- Readiness checks every 4 weeks
- Review Performance Centre use
- Support with other plan
- Lean half day workshop
- KPI, PR workshop

**Construction**
- Join 2-week Review meeting
- Support Lean tools
- Work studies - generate benefits
- Stakeholder audit every 2 months
- PR audit every 3 months

**Pre-tender & Tender**
- Contract Spec updates
- Mid-tender conference
- Post tender presentation review

**Pre-Mobilisation**
- Readiness checks every 3 weeks
- Enhancement Briefing
- Mobilisation plan guidance
- Support Performance Centre set up
- Support rationalisation of plans

**Notice to Commence**
- Commencement Date

**Down Payment**
- J. Alam
- J. Alam
- J. Alam
- R. O’Connor
- M. Noor
- A. Elsayed
- J. Alam
- R. O’Connor
- M. Noor
- A. Elsayed
- K. Basha
- A. Yousef
1. Enhanced contract briefing (pre-mobilization) - 2 hours
2. Enhanced contract coaching on site (pre-mobilisation) - 1 day per project
3. Lean simulation workshop (mobilization) – 3.5 hours
4. PR workshop (mobilization) – 3 days
5. KPI training (mobilisation) – 1.5 hours / per discipline
6. Lean Practitioner and User training – 10 days +
7. Lean training for site team (as required) – 3.5 hours
8. Lean site coaching (once a month min.) - 10 days
9. Enhanced contracts coaching for new/replacement staff
10. Ad-hoc training as required

Approx. **35 days** of training/coaching support per project
Governance – Enhancements Overall

1. Pre-mobilization deliverables Tracker implemented
2. Enhancement maturity assessment
3. PR & Stakeholder audit/check sheet implemented
4. Enhancement added to Progress Meeting Agenda
5. Enhancement in Project Presentation template
6. KPIs – PMWeb design + including in Monthly Report
7. Coach -what does ‘good’ looks like
8. Project support/ month to identify & provide
LEAN CONSTRUCTION
Bespoke Training Programme- Qatar Infrastructure

Training & Test Complete:
Phase 1 training: 67 delegates
Phase 2 training: 31 delegates

Training & Test to complete:
Phase 1 training: 40+ delegates
Phase 2 training: 36+ delegates

6-7 Modules per phase

Bespoke Training with Group & Individual Exercises; Hands-on guided learning on site

Phase 1:
5 days class room
Test
5 days on site for Practitioners

Phase 2:
5 days class room
Test
5 days on site for Practitioners
LEAN CONSTRUCTION
Training Supply Chain & In-house
Strategy Presentation by Company Senior Leads – how projects will be supported with enhanced delivery

• #11 Company Senior Reps Present to Ashghal Leadership 23-27 June 2019
• Presented on their:
  • **Company objectives** to support Enhanced Delivery
  • **Key personnel at Project & Corporate level** responsible for it
  • **5-6 clear tangible monitoring measures** for performance of enhanced delivery
  • Commit to **training and resources** required by projects
  • **Commit to senior management visibility** at project level
  • Outline the barriers to embedding enhancements
  • Define support needed from Client
Weekly Progress Review Meeting in the Performance Centre, led by Project Director, with GEC

On site Visual Board, DN004-P03

Enhancements Review stand up meeting at the Performance Centre, DN099-P01

Production Review at the Performance Centre, DN099-P03
VISUAL MANAGEMENT

3 month look ahead plan

Production record of Bulk operations

Resource locations

Procurement board

Issues & Actions Board

5S site organisation board

Key metrics board
LEAN CONSTRUCTION
Way Forward

2017
Proof of Concept
3 Pilot Projects.
Embed in Contract.

2018
Embed in tender assessment.
Grow Industry Awareness.
Award first projects.

2019
Support Lean in Construction.
Design Training.
Deliver Training.
Embed in Consultants’ Teams.
Design & apply improvement metrics.
Assess growing maturity.

2020 onwards
Establish tangible targets for companies.
Grow Ashghal Lean capability.
Engage external institutes.
Sustain industry capability in Lean.
Generate tangible value for Client.
Increase Lean governance at Project level.
LEAN CONSTRUCTION
Sustaining this Strategic Improvement – MBA research

PROPOSALS

1. Commit to the Lean Implementation Program
   - Client buy-in & Ambassadors
   - Apply in Contract
   - Contractor incentives

2. Develop Awareness & Capability
   - Raise industry awareness
   - Provide Lean training

3. Develop a Plan, Apply & Review
   - Lean Road Map – develop & review
   - Key Performance Indicators
   - Share Case studies of benefits

4. Engage People, Lead the Change
   - Grow skillset
   - Supply chain engagement
   - Empower people
   - Increase buy-in through leadership

5. Apply Lean Tools
   - Visual Management
   - Collaborative Planning
   - SS site organisation
   - Value Stream Mapping
   - Total Preventative Maintenance

OUTCOMES:
- IMPROVED IMAGE OF INDUSTRY
- VALUE FOR CLIENT
- CONTRACTOR PROFITABILITY
- MARKET COMPETITIVENESS

SUSTAIN THIS STRATEGIC MAP, PARTNERSHIP & SUPPORT
WIN-WIN FOR ALL!
79% of you think it will improve SAFETY
78% of you think it will improve QUALITY
73% of you think it will improve WORKER WELFARE
85% of you think it will improve PRODUCTIVITY

Around 65% think it will improve Contractors’ MARGIN
Around 80% think it will improve PREDICTABILITY of delivery
Around 70% think it will reduce Ashghal’s costs

122 respondents mostly agreed it helps!
SUCCESS ENABLERS

**LEADERSHIP**
Commitment and visibility

**One-team culture focused on continuous improvement**

**Capability and competency of supply chain**

**Continued support & steer from Client central team**

**Investment & EMPOWERMENT**

**Organisation strategic plan & targets**

**CELEBRATE SUCCESS—verified case studies, recognition & incentives**

**Early engagement**
In a rapidly changing world, it is not so much what we did yesterday but what we are capable of doing tomorrow that counts...
Ashghal - Constructing Excellence CPD Event

Lean Case Studies

Richard O’Connor
Improving productivity

LEAN

CONCEPT  DESIGN  MOBILISATION
FEASIBILITY  TENDER  CONSTRUCTION

MAINTENANCE

WASTE ELIMINATION

OPTIMISE VALUE-ADDING

MAKE VALUE FLOW

CONTINUOUS IMPROVEMENT INVOLVING EVERYONE
**Lean Construction Case Study :**
**Collaborative planning**

**Challenges:**
- The project team was faced with achieving a key zone 1 milestone in a work area that had some practical challenges and with what was considered a tight programme duration.

**What we did:**
- Held a collaborative planning workshop involving Contractor construction team, consultant and sub-contractors.
- Created a 12 week collaborative target programme (CTP) for Zone 1 works – used lean principles to define best work methodology, production outputs & work activity durations and to achieve efficient work flow.
- Developed detailed day-by-day 4 week work look-ahead plan (WLAP) with construction team
- Verified readiness of Design, Resource, Access, Materials, Plant & Permits (DRAMPP) and actioned any issues.
- Established processes for weekly collaborative production review and daily production control.
Lean Construction Case Study:
Collaborative planning

**Benefits:**
- 12 days (2 weeks) saved from original works delivery programme
- Realistic programme created to achieve 14 weeks’ work in 12 weeks
- High programme predictability – PPC 95+%
- Project team is targeting 4 week early delivery of zone 1 works – collaborative planning is deemed a key enabling process for this
**Lean Construction Case Study:**
**Improving productivity of open-cut excavation**

**The current situation:**
- Excavation works is a critical path programme activity
- Actual production output for excavation works was less than required to meet the programme.
- Extensive proportion of excavation works was to be carried out within residential areas of which many streets were narrow with residents close to the works.
- The existing working method was based on each work gang comprising 2 jack hammers + 1 bucket.
- The use of 2 jack hammers increased noise disturbance to the residents.
- The contractor was constrained on the number of critical plant (i.e. Jack Hammers)
Lean Construction Case Study: Improving productivity of open-cut excavation

**What we did:**
- Conducted a number of work observation activities to understand how excavation works were currently being carried out.
- Categorised and quantified the level of value-adding, non-value adding and waste work activities.
- Identified a number of issues and opportunities to improve.

**Current working method**

**Current process**
- Jack hammers delayed for between 10-20 minutes to enable bucket to remove loose rocks from trench.
- Occurred up to 5-6 times per day equivalent to average 75-90 minutes lost excavation time per jack hammer.

**Work Breakdown Analysis**
- Value-Adding: 49%
- Waste: 51%
Lean Construction Case Study:
Improving productivity of open-cut excavation

What we did:
- Objective – how to keep the jack hammers doing value-added work.
- Worked with the construction team to define an improved works methodology.
  - Improved working method
  - Elimination of wasted plant movement time
  - Improved logistics
- Conducted a 4-week trial to prove the new works method.

Improved working method

- Jack hammer excavates by layer
- One-day’s production then cycles back for next layer
- Bucket follows and clears as needed
- Bucket ensures trench (or next section of layering is clear ready for next day)
Lean Construction Case Study: Improving productivity of open-cut excavation

**Benefits:**

- New works method proven and adopted
- Doubled productivity
- Freed-up one jack hammer
- Reduced programme duration
- Improved programme predictability
- Cost benefit
- Reduced public disruption

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**Work Breakdown Analysis**

- Before: 49% Value-Adding, 51% Waste
- Improved: 18% Value-Adding, 82% Waste

**Daily Production Output per Jack Hammer**

- Before: 10 cubic meters per day
- Improved: 20 cubic meters per day

*Note: Productivity improvement depends on baseline and work situation*
The current situation:
- Backfilling works for foul sewer open cut trenches was a critical path programme activity.
- Backfilling comprised three key work activities – Deposit materials into trench, levelling and compacting.
- Current work methodology showed these works being carried out sequentially.
Lean Construction Case Study: Improving productivity of back-filling works

**What we did:**
- Completed a work observation activity focused on backfilling in normal width street situation
- Analysed work observation and identified issues and opportunities to improve
- Defined work methodology to improve the flow of backfilling activities
- Review and confirmed new methodology with construction team
- Trialled the new methodology for backfilling on foul sewer open cut trenches

**Benefits:**
- Time saved per metre backfilled = 4.7 minutes
- 40% increase in work productivity
- Total potential programme time saved per backfill team = 51 days (4% of programme)
- Improved programme predictability
- Reduced public disruption
- Reduced cost
- 8 months project delay eliminated
- Deep well install reduced by 6 months
- >8% programme reduction – first 12 weeks
- Programme PPC >>93%

- 40-100% increase
- 18-51 days programme saving

- 62% reduction in INR processing time

- 40-100% increase
- 18-51 days programme saving

- 21% reduction in install duration
- 13% cost reduction for micro-tunnel line

- Improved organisation of materials
- Safe working
Lean – A great start!

- Started our ‘lean journey’
- Started focus on construction phase
- Will naturally transfer to looking upstream
- Short-term wins
- Go to Gemba – where the value is created
- Lean it’s not an initiative
- Be prepared for the long haul
Thank you
“Ashghal’s lean construction initiative”

23rd October 2019
Constructing Excellence in Qatar

An Ashghal-incubated initiative to capture and share best practices and innovation for the improvement of the Qatar construction sector in support of Qatar’s National Vision 2030

Enabling Qatar to be recognised as the best construction sector in the Gulf, and Ashghal as the client of choice
Our legacy

- Qatarisation
- Know-how transfer
- International benchmarking and profile
- Trust and collaboration

- Independent locally-run legacy organisation
- Evidence base of improvement and best practice
- Culture of sharing, learning and continuous improvement

- A major CSR initiative
Our best practice agenda based on Ashghal’s new contractual KPIs

- Health, safety, welfare
- Project delivery (incl. lean, BIM)
- Stakeholder engagement
- Quality
- Environment and sustainability
- Benchmarking, demonstration/pilot projects
- Learning events, training & qualifications
- Awards
Our next events

November 5th  
Qatar Construction Improvement Survey 2019
*Intercontinental City hotel, West Bay, 5.30pm-8pm*

January 20th  
Best practice in construction procurement: 1) strategy

February 24th  
“ “ “ “ “ “ “ 2) tendering/award process

TBC  
Implementing BIM in Qatar

More on all the above at [http://constructingexcellence.qa/](http://constructingexcellence.qa/)
Panel discussion
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“Ashghal’s lean construction initiative”

23rd October 2019

See you at our next event on November 5th