

12th Annual Congress ♦ Oct 20-22, 2010 ♦ Boulder, CO
Oct 20-21 Meeting Notes by Alan Mossman of the Change Business Ltd
Oct 22 Meeting Notes by Cynthia Tsao of the Lean Construction Institute

Wednesday 20 October 2010

Seattle Children's project

Jeff Giuzio – Seneca Group

\$40m 79k sf clinics and surgery centre,
imaging etc + 240 space garage
client challenged Seneca to deliver lean
orig prog 110k sf
28% reduction in floor area

TVD
Absorbed 11% cut in programme cost 60%
into design

Used only 30% of owners contingency
How achieved?

- Early involvement
- Jointly developed and validated project goals
- Program and design rigour
- Comms & engagement
- IFoA

Support from Sutter, Lichtig

RPD = rapid program development sessions
on groundrules

- Programming and design
- Bring your own data
- Deep u/s of current state
- Metric-based decisions
- Mock-up simulate
- PDCA

Jointly developed and validated goals

Key points

- Bring your data
- Knowledgeable owner
- Major reduction in RFIs
- Patient flow scripts used to test design proposal

Questions

- did sellen use lean in construction
- when starting how did you come up with metrics and then validate them
- RPD process – what would you do diff
- How early did sellen bring their subs on

Answers

- Sellen in from start
- Resequenced design schedule to support construction
- Selected M&E from Day 1 with target budget
- MEP coordination started at end of DD

- Reduce floor area by 25%
- Deliver under budget
- minimise RFIs
-
-
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Prog design & rigour

- Key adjacencies
- Mapped core processes
- Space requirements informed by cycle and strategic plan volumes – Takt time – sophisticated client understood lean
- Macro mock-ups
- Micro mock-ups
- Set-based design
- Gradually adding constraints
- CPI = clinical process improvement?

Comms & Engagement

Daily newsletter

DTPC =

DTPC contingency – team agreed cap of 25% on what owner willing to pay

Observations

- Guiding principles could have done with more time and refinement to remove conflicts
- RPD agendas were complex

- Positive impact of operational lean on reducing sf of project
- Use of micro & Macro mock-ups
- Owner set on design
- Owner core group
- Daily comms & coord staff

- Role of owners rep in IFoA
- How was data brought to the table
- BIM & 3D ?, When, Sellen
- How far did risk & reward go down
- Will Children's use this again

- Other contractors brought in as reqd by design – only 18% of cost not tied down by the end of design
- pull plan everything – only took a month for people to find the use and want more
- did lean training – airplane game, other simulations

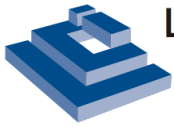
- RPD focused too much on objective analysis and opnl flow and not enough on human issues
- One week RPD → batch and queue design process → right first time
- Inability to inc future learnings
- Difficulty sep macro from micro design
- Impossible to eliminate all user group meetings after RPD phase
- Involved Equip and furniture supplier too late
- Recommendations
- Org and prioritising of guiding principles
- Consistently dispay and reinforce all guiding principles in design
- More intent to use human concerns in RPD process – natural, soothing, beautiful, comfortable, etc
- Better integration of design consultants
- Minimise siloing by incrementally move design forward on all prints
- ...

front loaded compared to similar job
far fewer RFIs
fewer owner changes

- Network of promises
- Client so focussed on efficiency forgot to get others involved
- Design iteration as waste
- Risk reward commitment
- 75% of contingency un-used

- Was the comparison project lean
- How do roll in the patient experience
- Advice to help architects
- Issues with not inc human experience
- Value of daily newsletter

- lean ran through the project from the client
- M&E Revit based
- Owners rep not tied to IFoA - ? conflict of interest – acted as guide – would be willing to put skin in the game



- IfoA revised to protect Children’s a little more
- Comparison project not lean delivery – negotiated, early involvement, but not lean
- Architect shared risk with design consultants

- Sellen did not do that, some shared incentivisation esp with Mechanical – would do it differently now.
- Children’s track their data and analyse it and have systems to track new data.
- Human experience needs to be handled at board level – different path – nicer to

- get consensus within core team and then take it to the board. More work to do on this.
- Shared detailing between architect and constructor in parallel at CD phase

Ideo research on patient experience

Building is just a tool – part of the owners operational value chain

How can our industry move up the chain so that we enable owners to get more value out of the facility?

A lean Journey: Delivering an MOB with TVD & LPS

Todd Henderson, Boulder associates

Customer pull – how we adapted lean/last planner – results

0.5m sf – half garage
across street from Cathedral Hill
some shared team members
core team not fully co-located
implementing lean LPS in design
why difficult?

- Design is generative – our current work determines our future work
- Architects are geniuses – culture within architecture – arch is like making sausage – don’t want to ask too many q abt what goes into it
- The fog of design – Hansei at end of project – when in thick of design – client, entitlements, users, fitting prog into site
Clausewitz On War – the fog of war

Ideas

- Study-action teams *The Toyota Way*
- → shared vocabulary
- → how we are going to do our work
- work planning
- individual work planning w/ 3 week lookahead -
- team work planning with 6 wk lookahead
- first planner push and last planner pull

Key Points

- Significant perseverance of the team
- Builders don’t u/s how designers work
- Closer desks → better collaboration
- If its not fun you’re not doing it right
- Tracking – resp to e/one’s work
-

Questions

- How long have BA been working on this
- How did you get team members on board with number of meetings
- Time for tracking data
- Share design team meetings with other design
- Ramp up time

Answers

- Only <2 people in SF who attended most of the meetings – rest in Boulder

Reliability

- reliability = Good
- track reliable commitments – Newforma → outputs to excel database – captures well formed commitments → team work plan/ commitment log – highlights overdues - → clarity about what designers have done in a form that can be shared with client.

- Wwp
- Sit in ways that obscure rank
-

- Commitment tracker – tiara
- Choosing by advantages & A3

Hansei

TVD

CMGC estimates throughout design
enabled short loop iterations – sharing info weekly

Lowered target cost

Results:

- Builders don’t u/s how designers work
- Working within ambiguity
- Suspending judgement
- Evaluating intangibles
- Exploring alternatives

- LPS adaptation
- You can tell insincerity
- Insincerity kills
- Architects bring a unique set of skills
- Short loop iterations

- Challenges from team wrt staff development
- How were you paid
- Would you have implemented this without an innovative client
- What were leading causes for missed commit and how changed

“Can’t you just draw it the way its going to be?”

Aesthetics easy to attack, hard to defend
Experienced professionals sometimes feel slighted when told how to work better
Conjecture: the more design diva the more resistance to L/LPS

Clashing corporate cultures

Differential enthusiasm – insincerity kills this stuff

Dumb IT iterations – chat printers file access scheduling, reserving rooms → control and management issues

Time spent improving processes is time well spent

The closer the desks the better the collaboration

No silos to hide in

One *negative group member* can poison the team - google

0.6% overtime

quantum leap for BA on this project – planning work - accelerated staff development → filtered out into other projects

- Time spent impr processes is time well spent
- Pre-con vs post design → silos that still exist

- Impact on profitable and viable org
- Hints 4 dealing with creative people who don’t want to be tied down
- How did you manage to win contract against lean team at CHH



Design & Construction of Solyndra: Fab 2 Solar Panel Fabrication Plant

Terry Wheeler & Ken Hyland CH2M Hill + Leigh Askew, Kevin Fetig, Michael Piotrkowski Rudolf & Sletten

\$270m 609,000 SF

Hybrid IPD – standard contract but IPD behaviour

60% design complete in sept 2009 – 10.5 months then to completion in July 2010

- collaborative relationships
-

building size reduced first by 30% and then a week later by 50% in June 2009 → effective redesign of project

MEP brought on later because that is how client wanted it

75+ interactive systems in project

RbPD

Commitment based

Value focussed

Iteratively planned

Daily checkins for promising

Retrospectives for learning

Key Points

- Splitting macro project into micro projects
- enrolment process
- daily meetings to review RFI
- having city on board

Questions

- What incentives and metrics – were you successful
- Who attended daily meetings
- How avoid rework
- How manage gap ...

Answers

- “a good plan executed today is better than an excellent plan executed ... Patton
- incentives included MEP
- milestones based on schedule based on client production line set-up rqrmts
- major OSF worked well – based on model – fab done offsite in local contractors workshop – other fabs from OR had a

Network of commitments

One person needs to be responsible for making it happen – implementation

Proposal phase - preliminary design – detail design

Working with non-lean design partners

Alignment of team without the client

Collocation helped preliminary phase – but not so possible in the redesign

Daily checkins not so effective because pull plan not fully embedded

TVD

Collaboration

CH2M + R&S

Bridging concept – starts with collaborative design sessions – recognise that MEP

DB trade partners are a primary

customer of MEP PDR documents –

clear definitions for MEP @60% design

Periodic review of detailed design

- project proposal as sep project activity
- MEP TP is primary customer of MEP Designer
- Designer mindset to break ground
- Bridging process

• How did the enrolment process align

• What levels involved in alignment

• Was AE team involved in MEP coordination discussions

• How did trade partners play in sandbox

union sticker. Developed relationship with unions early

• 2 members from the city attended twice weekly meetings

• rework – pouring slab at same time as sub-slab changes going on at request of client (in dynamic business)

Offsite meeting with owner, design and MEP Trade partners

In construction

Daily OAC meetings

Building as design

Pull planning

BIM supported prefab

Learning

To combine and integrate

Next time

Try BA process for managing design tiem

Choosing by Advantages with the customer

Location based management

“even if you are on the right track, you’ll

get run over if you just sit there.” Will

Rodgers

- Behaviour doesn’t have to be driven by a contract
- Visual workspaces – due date on trailers

• Why exclude client from enrolment

• Were prefab multitrade

• How handle union wrt prefab

• TVD – was client involved

- enrolment process: kennel of old dogs – overview of the process, why, some of the issues explained so reasons for change clear and explained implications for others – opportunity for subs to back out – think and communicate personally (peer pressure otherwise) – candid discussion – client understood why and

“Don’t let perfect get in the way of good enough”

Contracting for IPD: principles, Elements and Experiences

Howard Ashcraft Will Lichtig Hanson Bridgett LLP

Number of different perspective and they all end up at the same place

Pankow – more integrated → more sustainable

What matters is outcomes

What is the structures that makes the outcomes possible

Structure

- Early involve
- Shared risk/reward
- Joint project control
- Collaborative D-m
- Reduced liability exposure
- Jointly developed validated targets
- Minset
- Trust

- Willingness to collaborate

Catalysts – not necessary but you really need them

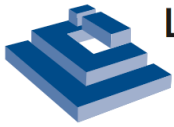
- BIM

- Lean Design and construction

IPD structure

- Diversity → creativity

- Feed forward – archery metaphor



- Efficiency
- Risk waivers to build commitment
- Joint validation of targets, goals and costs
- Project outcome – how does it address

Negotiation

- Negotiation is the first collaborative act
- Key terms summary
- Key issue negotiation
- Process design workshop – how we are going to do the work - BIM

Commercial terms

Multi-party is not necessary – but easier for lawyers, and psychological benefit to the team

u/s real risks

- Risk vs exposure – late delivery is not covered
- Insured vs uninsured

Will

Facilitator of team working towards an agreement

All stakeholders need to be present as soon as possible – other orgs are performing pursuant to the IPD agreement so it is appropriate to involve them even if they are not signing

Initial focus – learning

- Study-action teams – what does IPD mean to us and what do we want to do here?

Howard

Spider diagrams to flush out the owners fears – if you only tell me ... - tell your team members

Leadership is different on IPD projects

Key Points

- Est common u/s IPD
- Real incentives based on value not cost
- IPD is soft skills
- Layer as facilitator
- Clarity on contingency

Questions

- What are the key leadership characteristics for IPD success
- To what extent is price competition ...

Answers

- Insurance – Will: no problem with current insurance depending on how your agreement is written – trying to move the insurance industry to back IPD – Sutter pursuing – so that no need to sue to initiate a claim. Carriers are working on this. Howard refer to teo projects on east coast expecting OCIPs quotes in next few weeks.
- How do you factor in cost to procurement – profit and overhead is key area. Also ask for ideas about current

- Cost of doing nothing
- Key issues for negotiation
- Profit at risk
- Amount and type of incentives – enough profit at risk
- Target cost – what is the number used to determine compensation – IfoA = Est Target cost
- When set – earlier set more incentive for design (early on simple projects, later on complex ones e.g. part way thru DD) -
- How validated
- Why can it be changed
- Which is more important – value or cost
- Contingency – how to be used – think about it – fear related to excess contingency – limited access
- Project management -
- Extent of liability waivers

Transparency and trust – talk about how you make money, u/s how make a profit fosters ownership and collaboration

Address human and commercial concerns of owners – esp fears

Build conversation about obstacles and goals in pursuit of the opportunities

Shape new leadership paradigm for the project – IPD requires new skills

- Focus on why things happen to get desired behaviours
- Asking what if to expose fears
- u/s risk vs exposure
- u/s how people make their money

- Our = Hanson Bridgett
- Public sector client lawyers want to protect their client

cost model. Selecting team members for fit – optimise the design and you can save insane amounts of money

- Public sector clients – need access to senior level – public IPD is possible and IPDish is easier – focus on a decision maker. There are lawyers in the same place who if they are part of the building of the tribe they are more willing to collaborate – mitigate the harm that they do.

- Understand the Business model > contract terms before making changes to the agreement – don't assume your lawyers get it
- Deal first, language last – figure out key project drivers
- Practice what if once contact signed to learn how it works
- Be transparent
- Negotiating the contract is the first collaborative act ...
- But signing the contract is not the same as living it – actions speak louder than words
- u/s why you signed it and ...
- experience helps
- www.ipd-ca.net

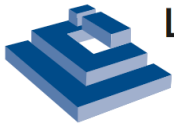
Beware of unintended consequences

Create project rituals, markers of the tribe, build affiliation with the project, to drive a unique project culture – sign contract in same room and then share a meal together. Use agreement as basis for SAT – we are a different tribe and we have our own rules for how we work together.

- Bad teams can screw up a really good contract
- Fear kills creativity

- Insurance collaboration
- What are the insurance issues?

- Leadership: Marc – process, behaviours Passion, purpose, perspective – see afresh – patience, persistence, learn = listen, empathise (stand in shoes), aggregate views, reflect, nudge – support parent with child on bike. Honest, integrity, strategic – ideas matter, authorship doesn't.
- IPD – LCI contracting meeting – history of development of US relational contracts – IfoA out of LCI contracting meeting – HB from studies of failure, CURT, ...



How IFoA works on small projects: Mills Hospital Project team

James Pease – Sutter Health; JD Ahearn --- Herrero Contractors; Jeff Harrison – Harrison Drywall; Dennis Mowbray – Perkins Eastman Architects; Paulo Napolitano --- Herrero Contractors Objectives

20k sf remodel of third floor - \$14m - 100% profit at risk IFoA
choosing the right team members is key tight schedule
Herrero on board very late after previous contractor sacked
Lean is delivering customer value with streamlined process practicing continual improvement
Intensive lean training – IfoA – Lean Training at Herrero – LPS – 5S 3 hour training – Play catch, reliable promises
True north integrators (indicators) – Project Eval'n Criteria = customer value → TNI = True North Indicators → KPI → values matrix, affinity diagram,

headers, KPIs, design frequency, relationship diagram (what drives what), define date to publish KPI, respnd to KPIs, lessons learnt, 5 Why, countermeasures, standardise PDCA => schedule, budget, q, safe, collab, cust satis, lean, VDC, IFoA:: relationship diagram showed lean collab and IFoA critical drivers – survey monkey for collab.

Focus on ps and ci – instead of blame Learning
• Collaborate with direction and constancy of purpose is more effective and efficient –

- Dennis Mowbray Architect - statement – very important ●●●●●
- Pulling the andon cord really works – stopping to fix problems works faster
- LPS works - when used correctly – be hard on everyone
- Next time
 - Be more disciplined at atrt esp
 - Address disruptive behaviour
 - Train earlier
- Results
 - 500k under goal
 - value add 800k
 - no change orders.

Key Points

- size doesn't matter
- time to define true north
- slow down to speed up
- focus on drivers to influence schedule and budget
- u/s value from all players views

Questions

- why not replace misfit trade partner
- change in behaviour from OSHPD

Answers

- All ps starts with reviewing collaboration
- OSHPD Inspector of Record – involved in LPS at least every other week

- training syllabus
- removing substandard part to optimise whole
- team members to enforce collaboration
- be committed to break down deliverables in to deliverable packages

- what discussions before replacing GC
- comments on workface reactions

- Changes at workface – process enabled supt to coach foremen, training for them too.

- owner is not the only customer
- all about owner value
- using affinity and relationship diagram
- focus on problem not blame
- trust is huge in IFoA

- dennis learning after Toyota involvement
- KPI represent true north value

- Collaboration survey – get commitment – sign form
-

Orlando Utility Commission (OUC) Chilled Water Plant Revisited

Owen Matthews IPD™ in conversation with Greg Howell

Don't you believe you need a true team to do a lean project?
Owen wanted a job but as mechanical contractor he couldn't get it. Needed Started MEP Inc – Refub helped them develop way to share money on project
Architect and GC became interested again IPD formed
Owner not involved

A single entity that would deliver the project to the owner
Internal agreement
Orlando utilities commission – RFP 5yr chilled water plant programme
Split with another team

One scope one price; guaranteeing others work

Leadership
Similar cultural background to
Lost two members 'cos of breakdown of trust, integrity
High 'relational capital' – built by making and keeping promises
We are one team
Changed supt to fit with the stage of the project.
GC doesn't mark up

Key Points

- Shared costs and guaranteed each other work
- Supply chain originated IPD of owner originated
- Grass roots grew into lean

- Strive for immaculate coordination
- Collaboration → better design
- Take contingency out
- One team, one price, one scope
- Shared responsibility

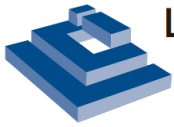
- Attention to detail saves money
- Relational capital
-

Questions

- dB what

- use lean tools

- how bring gc on board



- how v1 compare v4
- what is contract with customer
- single BIM?
- What do maint people say

Answers

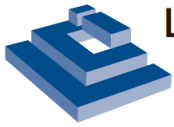
- Cost reimbursable in a way agreed 10 years ago – bill owner as agreed
- At end of job gross profit divided by formula

- Did owner not ask if share ideas
- Waiting list to get on the team?
- What does customer think?
- Do you do all projects in this way?

- Embarrassed by first project now – didn't understand a lot of what we understand now
-
- Used LPS on last two jobs – not on chiller plants

- How is project cost accounting managed?
-

- Sharing ideas –
- IPD Inc projects became an insurance problem
- Maint happy
- Its exciting its fun no RFIs



Thursday 21 October 2010

Transforming Grunau Company

Grunau Company --- Ted Angelo

Mechanical contractor – prefabricator – est 1920 – part of API Group

Hospitals, breweries, ...

Always interested in being better organised on the jobsite

5S

lean construction 2002 – met Greg

Lean: The Grunnau Way

Mission – to continually examine our processes to provide greater value to our customers without waste

BIM, 5S, LPS,

Problem solving tools – set up reduction, root cause, flow charting, pareto, spaghetti, ishikawa, error proofing, A3
#1 reason to do lean is because of the customer – because the customer is demanding it

Assessment – hired consultant first – what does Grunnau expect of you?

- Bad news – no one else trying to do what you are doing

Key Points

- involve users in changing system
- teams make lean
- accept ideas from wherever
- impr = change
- everything that is repeated standardise
- ladies

Questions

- how handle resistance to change
- how die support groups respond to VSM
- how cascade to field

Answers

- Work processes influenced most recent move
- Nothing negative re VSM – for first time they were being asked
- Newsletter every couple of weeks

- Good news – you can write the book
- Steering committee – vision
- Joint memorandum with Paul Grunnau IV – changing the culture of the company
- Sets agenda for year ahead and hands off to teams

Training

- Part of the rumour control system
- All 500 people trained
- Assessment systems have changed

Activities

•

LPS

- Daily planner – 6 questions
- Responsible party names individuals
- Cooperating for the benefit of the customer

5S

- choose a first project with WOW factor
- chose toolroom on a big project 100' x 50'
- 30sec find rule
- sept 2003 – planned for 4 months
- **teams make lean**

- start with assessment of where you are at
- change cultures
- unleash power of workforce
- execs leading lean impr events
- its all about the customer
- tight couple between

- to what extent did work process improvements → new layout
- how you share ideas

- Customers notice – Miller brewing had Ted run 5S training for its people
- Still some resistance –
- Kanbans in sheet metal shop and on jobsite with hardware boxes

- day 1 – initial training, discuss how to
- reduced 512 steps to fill a tool box to 250
- have women in the team – they look at things differently
- patterned after a supermarket
- then: yards, warehouse (reduced size to 2/5, rest used for fab), plumbing shop, weld shop, vehicles, metals shop, service space, sales office filing,

VSM

- Accounting
- Office reorganisation
- Team – 15 – problem with turf wars – started with how they were going to meet the goal-private offices around the periphery of the building → log jam – Paul Grunnau 'no private offices including me' - not a problem with noise and better communication – more flexibility

improvement = change

•

- educate your people
- involve users in change
- share the learning broadcast it
- champion
- all about customers

- what did customers notice
- have you used kanban
- KPIs

- Unions – not once did he contact unions about this
- Nothing in budget for lean.

11 Years In: Update on GyM's Lean Journey

Graña y Montero – Jorge Izquierdo

How do you know someone is on board with the new culture?

Who – what – how

Mining, energy, infrastructure, building, Started with lean in 1999

Situation – we didn't know about production

Mining projects have high level of dependencies

Process reliability and add remote locations, weather, social factors, etc; dependence on third party design and reqmts for speed.

Loss by flow → loss in process

Crucial to reduce loss in flow

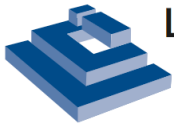
Reducing loss in process is secondary

Work level planning - Work designed to give same amount of work every day

Daily work plans

→ much easier process

confront variation



use LPS
focus on production on a combination of support activities

support process - support lookahead (fed from main constrain analysis), weekly plan, PPC
teamwork – execution teams, support teams → production flow + professionalism
efficiency , reliability and productivity are related

steps

Key Points

- work smarter not louder
- predictability of workflow
- industrial construction as production system
- confront variabilities
- focus on production

Questions

- Engineering design – how did you marry it to field
- How do you define right flow for any project

Answers

- Design problem not solved – working on it
- Growing too quickly for training and ideas to keep up + more aggressive with budgets in current climate
- Training for operatives
- Flow for project – we measure flow through PPC –

- Initial consultant support
- Create own knowledge
- Designed own project management system based on production management and LPS
- Now running out to whole company
- Training is important – teaching how to fish – action learning + horses for courses
- Young engineers working with teams for 10-16 weeks
- → better control of projects; 100% on time delivery for 15 years; tripled company in 5 years; ROI ratio for LC implementation area is 6.5:1; improved

- creating own knowledge base
- reliability → productivity
- you can't teach a man to fish with ppt
- change culture by changing what it means to be successful
- add own salt and pepper

- ROI – whats in measure
- Sponsorship from clients?
- why the drop in productivity

- Two clients – expanded LPS to them as they were a major constraint → PPC for their teams and the y are very happy with this and it is leading to more work
- 6.5% is from difference in efficiency between actual and expected
- its not 55% - we plan to double the company in 5 years so ... We train trainers

client relationships; only 45% of staff work the lean way so still a ways to go
• people and knowledge; constant learning → reliability → productivity, efficiency

focus on

- production as main management priority
 - make and keep promises
 - efficiency as competitive advantage
- lean helps
- its not easy – takes time – keep at it, thinking is not enough
- LPS as a disruptive system – highlights problems
- → competitive advantage; more construction for same \$

- confront variability early
- don't just think you have implemented lean, know you have
- visit Peru

- How did you implement change in how you eval people for promotion
- Plan to train remaining 55%
- Training to operatives?

in the unit and after a period they move back into the line to infect the projects they work with. This supports the direct training we do.
• Evaluation focus on how relate to people as well as lean stuff.

People really matter

The people in the office (college grads) work for the people in the field

Break - Short reports

Fritz Gehbauer - Germany

LCI-de

Tehran Metro

Key Points

- Lean principles anywhere

Questions

- How many died
- Assessment centre

Answers

- No fatality stats; its safer than Afghanistan

- Lawyer on board

- Do German construction forms have an R&D function

- German firms have R&D budgets

-

- Do the coaches from Porche

- Assessment centre – to train client and team 3 days

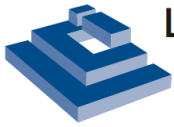
Sutter Medical Center Castro Valley: Progress and Possibilities

DPR Construction --- Ralph Eslick

Camino Medical Centre, Mountain view – first time I heard Glenn – material management, JIT,

Scott arrives with 5 big ideas
Camino Lean – initial BIM + lean + LPS + GMP sub-contracts + VSM + WWP

And I thought I got it back there in 2004



Did Stanford MOB refurb after - GMP + updated P6 schedule – did LPS, BIM, laser scanning, SMCCV
Digby Christian –
Daily pull planning,
Daily commitments – commitments save time – 15 minutes every morning + big room every two weeks for design – daily commitment meetings for site work too.
Total package – CPM for milestone management – 24 milestones – line of balance w/ vico control to optimise schedule – pull scheduling – filling in

gaps daily – Using SPS – logic to stickies – bim – Last Planner -
True partners – 11 party agreement – Why are these important?
• Commitment meetings save time –
• Total package = culture of innovation
• Partnerships → endless opportunities
Lessons and opportunities
• Plan everything and then plan again
◦ Start with what you think you know
◦ If necessary replan the milestone
◦ Start with a list
◦ Start with chicken scratch
◦ Start with what goes wrong
◦ Planning procurement of doors frames and hardware

◦ In 34 years I've never had doors frames and hardware go right
◦ Plan replan
• Model is only good if you look at it
• Smarter → faster → better
◦ Blowing up silos
Next time
• Grow the IFoA – include ceilings, rebar, steel, elevator, exterior skin + civil engineer
• Plan *and design* for pre-fab → would lead to a better job
• Connect the model to the field
Future
• If we can drive the risk so that clients understand that they have their arms around the risk

Key Points

- Its all about communication
- Start with what goes wrong
- Daily commitments
- True partners

- Plan and plan again
- Model only good if you look at it
- Total package
- Start with chicken scratch

- Expand IFoA
- True partnerships produces endless opps
- LPS not a cost

Questions

- Centralising logistics – how is that working
- What did Ghafari do?

- How capture lessons and take to next project
- Who runs 15 minute meetings every morning

- Agenda for meeting
- Location based planning software
- How does team compare to non-lean

Answers

-

Lunch

Production Innovation: Applying Target Value Design to Construction Operations at the California Pacific Medical Center

HerreroBoldt - Dave Thomack & Klas Berghede

Innovation
Trade contractor understands his own work better so that he is able to reduce his staff costs 25%

CHH
Now \$20m below target – still want \$14m more

Start construction 1 July 2011

Production innovation
Production innovation ideas = PII – standard process

- Facil interdisciplinary collaboration & prod'n analysis
-

Where do good ideas come from? Stroke of brilliance from individual → increase the pool; large breakdown; learn from others;

Key Points

- Spend most time studying current state
- Challenge current industry practices and craft involvement

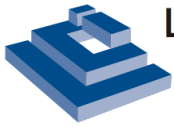
PII Process

- Capture the idea develop wwp
◦ (start with what went wrong)
◦ Capture
◦ Add to log with description
◦ Assign champion
◦ Incorporate in WWP – so it can be tracked
- Analyse
◦ Id current state- observe, map VSM, process, cost, resources – involve those who do the work
◦ Watching – why do we do that?
◦ ID future state → new std process with clear savings
◦ ID conditions of satisfaction – what do I need from others?
- Align and coord

- Production clusters
- Setting ambitious financial goals to orient the team

- Review with production cluster – happens alongside above as well as formally after
- Present to TVD-Production group – tough Q are good Q
- Approved in TVD-P
- Jade horse ritual – gets passed around
- Assign confidence level – some leeway to ease into new ways of working
- Standard and document
◦ Adjust estimate
◦ TP draft the Std Production Document SPD
◦ HB to review and add to the

- Lan prod'n systems drive everyone to be better
- Assign a confidence level



- Get beyond assumption based d-m
- Jade horse

Questions

- How use SPDs on future projects, new teams
- Do you track variation in VSM for time
- How decide on 25% of labour savings as proper goal

Answers

- Standard production documents – no process for sharing with other projects – yet
- Rosendin – foreman sector books with standard processes – standard

- Process has to happen early on
- How would you address ideas with less than 2 week life span
- How proving savings
- Is safety and quality tracked as well as cost and time

- procurement requirements so materials arrive in desired format – CoS for whole team
- Track variation in VSM – yes
- 25% was what was agreed.

- Role of GC and project team – more of facilitator and integrator
- H2 assure great ideas are implemented
- Are there common themes around the kinds of waste you are discovering as you go deeper
- Safety and quality are driving factors
- Going deeper – discovering we know much less than we thought – Defects in communication and over production

Break

Prefabrication and Private Finance Initiatives

Victor Sanvido Southland Industries & Mark Konchar Balfour Beatty Construction US

Vic

Definitions

Prefab – making one piece in controlled conditions

Preassembly

Modularization

Design process - where it starts

- 25% costs at concept. 75% determined by ...
- Validate project with team
- Define loads id system impacts
- Search A3 database – has this problem been addressed before
- Decide on scheme – choose by advantages
- Model the solution – clash detection is waste – how to get it right first time
- Vertical design solutions are easier in 3D
- 2 step process SD → fabrication – 4 phase design process doesn't make sense for today
- some things you want to conflict eg pipe hangers and pipe
- draw everything to enable prefab – even stuff less than 35mm
- pipe spools → pipe rack modules → equipment skids → multi-disciplinary prefab
- model all supports
- custom software for layouts
- prefab std hangers
- kitting

Key Points

- Clash detection is waste
- Developing self critical org
- No fittings unless they are on a pipe
- Am I attacking something already solved
- Using u/employed autoworkers

- automated spooling, MTO to enable precleaning and pre-cutting – taking cutting out of the field
 - drain waste and vent – pre-cutting – connecting to valves – kits to site
 - duct pre-assembly
 - laser scanning to enable pre-fab for refurb
 - 35% of work tfr to shop
 - 50% fewer accidents – backs and eyes
- lack of prefab could mean
- unable to design and plan your work
 - project has no floe and reliability
 - don't care about safety
 - owner has money to waste
 - job has a fat schedule

Mark Konchar Balfour Beatty

Definitions and benefits

Single system prefab

Multi-sys prefab – modular

Managing the process

Ship building parallels – Visit in

Germany

BB engineering services – innov and

value engineered solutions

Why innov

Budget pressures

Safety

Quality

QE Birmingham

• safety – zero harm – no hotworks, no

working from height

- Why can't we do this as a discussion of excuses
- Must model everything
- Go vertical
- Safety enables innovation
- Conflict is an opp to innovate

- limited resources
- site constraints
- repetition (process vs product)
- FM focus – batch tracking
- Delivery and concession targets – energy and availability

Parkland in TX is importing some of the same learning

- Safety and sustainability
- Supply chain partnerships
- Map process
- Understand dependencies
- Cladding systems
- Reducing site hours
- summary
- mfg team strategy
- Process control gives programme certainty
- Developing self critical org
- Redefine and remove waste
- Move to inter-company/system waste – learning how each other work

- Owners buy a portfolio of projects from a team

Changes in people

- Victims to victors

•

•

•

No surprises no excuses

•

- Go and learn, don't wait to be trained
- Redefine and reduce waste
- Contract draws most waste
- The more you do the more you get



Questions

- How handle multi-disciplines in same 4 story riser
- How did you engage auto-workers
- How complete connections without hotworks

- Any union issues wrt to multi-disciplinary
- Did you know where you were going?
- H2 integrate prefab into early design

- Did you involve inspectors in multi-disciplinary
- PFI in UK – is Parkland? ? e/where in US

Answers

- Inspections – OSHPD yes – and e/where too
- Water air controls and electrical – skids everything – now looking at drywall implications
- Parkalnd is not a P3 – 15 projects in Ontario Canada

- Bob Francis UK – set up process and brought all knowledge
- Southland – no union issues yet
- Skilled people are not needed on site any more to put designs right – they are important in design detailing, etc
- Some hotworks required on job

- Crews identify with the union when the job sucks – when its going well they identify with the project.
- Goal – yes: we had ridiculous project constraints. And no:
- Going faster is a requirement given the value of money – 150 rooms completed a week in Vegas

Roof Structure Prefabrication & Value Stream Mapping in Preconstruction

Hy-Vee, Inc. & Hy-Vee Weitz Construction

Daniel Willrich - Hy-Vee, Inc.; Mike Penningroth, Jeff Scandrett, & Matt Hendrickson --- Hy-Vee Weitz Construction

\$50-70m pa – JV between Grocer and constructor
doing business on a handshake for 15 years
faster-better-cheaper mantra

High level of hy-vee value stream

- Robust dialogue
- Instills pride in ownership

VSM – mapping to see
Team members
Current state

Roof panelisation
9 x 12m modules

Faster project delivery
Steel faster
Collaboration imporves work flow
Overlap

- big room concept
- One team goal
 - Involve stakeholders early

Key Points

- Enthusiastic ideas for impr even before map drawn
- Std VSM process
- Visual display of VSM
- Can do on smaller projects, companies
- Prioritise impr

- Make certain starting with problems or issues you have
- Building without lawyers
- Handshake agreements
- Lean non-believers can be converted

- Improve the day of the guys doing the drwgs
- Much waste related to comms
- Building safety in
- Having the whole team there – needed accountant and owner

Questions

- How choose to panelise on the ground
- Any thoughts to include some of the other trades, hangers assoc with roof panels

- Perimeter protection part of panelisation?
- Any before /after cf?

- Special design considerations for panelisation
- What other future modularisation envisaged?

Answers

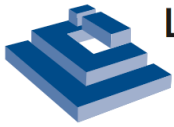
- Client facilities and equipment → design → lots of variation; tuned that round so then std panels possible;
- Saved 2 weeks

- Want to put insulation, membrane, ductwork, .. on in future
- One piece flow is a constraint – we haven't been disciplined enough to do it; inherent variation in a new method;

- Mitigating weather exposure
- New problems emerging as we are speeding up

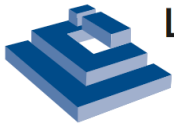
GB – struck by the impact of *self-imposed necessity*

- Not working of the ground
- No hot works
- Reduce number of operatives on site



GAH – like sequence – map connections between presentations –

PLUSSES	DELTAS
<ul style="list-style-type: none">• Champions• Presentation process• Great flow• Boulder• Greater diversity• New stuff• Video recording• Notes emailed to us before we left the room• On time	<ul style="list-style-type: none">• Dark pictures• Activity: pull plan• Speaker bios• Go somewhere else• Key points after Qs• Publish attendees by cos



Friday 22 October 2010

Afternoon Reflective Conversation

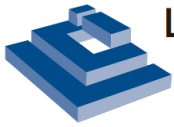
POSSIBILITIES – REQUESTS FOR LCI AS AN ORGANIZATION

Better use of questions board

- Develop reading list
- Develop glossary
- Associate graduate students with presentations
- As a relatively new organization, focus on building our brand
- Janette K: Expand to include all membership in doing what they can grassroots-wise to work with other trade organizations e.g., DBIA, AGC, etc. Surety producers may be interested in lean mechanisms, construction attorneys (alternative dispute resolution), insurance companies (international field of practice for insurance coverage), local communities to write articles to build brand and get our name out, inspire with 100-500 word articles, go to trade fairs and have booths, being lean is a good marketing tool, get the competitive edge as a contractor and trade partner, help companies know how to market, introduce lean into marketing materials, templates developed and shared in a template bank, resources (reading list, train the trainer), leverage scale of membership
- Figure out a way of how to build value for our members
- 7 points of contact, if only twice, you got 5 more to go
- Improvement ideas and A3s, they looked at their A3 log to make sure it hasn't happened before, maintain a computerized web-based with everybody's ideas on it, a lot of companies are talking about keeping A3 lists, why not do that for the industry
- Go to gemba: trade unions – opportunity exists, e.g., SMACNA has lean training for the journeyman
- Alex Lichtig: Golf tournament
- TAPPE has a trip to a mill, we ought to go visit a lean project, go to gemba
- Nashville with all the flooding, see the projects there
- Frank Barnes: Thanks, my 2nd Congress, I've tried to convince my colleagues but have had little luck, we have tremendous waste, Carribean name is a big brand, people pay money to go, big market that we are missing, start an awareness program, I volunteer to be the catalyst, maybe a newsletter, to start forming a chapter in Jamaica, then go to Trinidad, and then to Barbados, that's the support I need because it's a tremendous opportunity, I am crying for help, I came in touch with Greg in 2004, I did some research and did some lean construction, we really need some help
- David Trent: It starts with you, don't give up, it will snowball
- Alan Mossman: Christine Pasquire and I have been developing a document and project database, it's recently gone live: leanlearninglab.co.uk we've got a lot of documents up there, mostly documents, we're hoping to

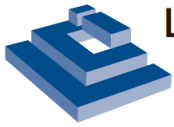
add detailed projects, developing a separate file to join together all the papers that talk about Cathedral Hill for example. Tariq, Christine, and I have a substantial glossary in our book, so that might help be a resource.

- David Hagan: A lot of things that exist, but it's just not shared. How do we amass all the information out there?
- Will Lichtig: How do we establish it under the LCI brand? It does become a stamp of approval. Current best practice as recognized by LCI.
- David Hagan: Greg was writing letters/blogging.
- David Trent: Communication and branding, how to manage it, Cynthia do you need help with vetting the website, with regard to branding, I see it as absolutely key in moving forward, maintain the brand and solidify our position for the long haul
- Dick Bayer: What I heard from the leadership forum, we have to earn support in the community, we do something different from all organizations out there and better, we do one thing better than anybody else in the world
- David Kimball: Don't worry Frank, we have that same problem in Boston, we have concern about how the unions will react to the pre-building of the systems, if we can approach the unions on the onset, this will help facilitate the transition better
- David Trent: It's a non-issue with organized labor.
- David Kimball: SF unions have a program for training journeyman
- Greg Howell: We had a Labor Symposium in 2004, we had CURT, unions, Denmark union leader to discuss this set of practices
- Will Lichtig: Convene a conversation with organized labor on how we work with organized labor
- Ted Angelo: Every single contract, there's a management clause, you can do whatever you want from a management standpoint, I've never had a problem, I'm responsible for determining who does what, if there's a problem they will sort it out
- Will Lichtig: How about getting them to be advocates
- Ted Angelo: SMACNA asked us to help them write the manual, if you already have something in the contract that allows you to do that, then why do you want to stir up the issue?
- Sellen: You would think that in building a hospital, we could share a problem, but the thing is, I can't, up until today, this was my schedule, and we'll do it my way. We're not working this as you're the plumber, electrician, etc. To make it work, we got to work as a team, we got to figure out together how to do our jobs best.
- Will Lichtig: If you go to level of off-site prefabrication, you will stress the view of...
- Greg Howell: There's a great deal of dissatisfaction in the industry, we're here because it seems like there is some progress and there's some possibilities, let's gather our forces to transform the industry, one of the groups is the unions, if we are setting out to trigger or cause an industry transformation, we need all the help we can get, if they



recognize the opportunity for transformation, I encourage from tactical view to a strategic view

- To move the measures we are talking about, we need legislative changes, we need to educate all industry players about what this means
- Dick Bayer: 37 states with some form of Design-Build legislation, opportunities with unions is that they are learning centers and they focus on safety. In the short term, what can we do today?
- Greg Howell: There are other organizations that have strong lobbying capability, why don't we put our shoulders behind it, the industry in San Diego asked CMAA to lobby for change in California to allow for all types of project delivery methods
- David Trent: Industrial guys may be able to help. Have a conversation with local building trades, modularized in the south in Philadelphia, don't regard it as a hurdle, local building councils, don't make a major issue of it, it's not that bad, beyond that, these guys want to take pride in their work, go home safely and show their work to their kids
- Sellen: Unions have high-level guys giving all their speeches to help educate the workers, help the whole process go faster
- Ted Angelo: Get into training materials for unions
- Paul Reiser: I would hate to see us rely on LCI to do the work that we should be doing, they are just people
- Bovis Lend Lease: At local levels, explore opportunities with professional organizations at the local levels
- I see a lot of parallels with USGBC, multi-disciplined organization, their main product is this LEED system that has taken over the world, they've got templates, multiple modules, training systems, local chapters, it seems like you are the early growth part of where USGBC was 10 years ago, I sit on the Denver advocacy committee, there are a lot of things you can learn from their example, their goal from the start was market transformation, in essence that is where you are at, we want market transformation, how did they do it, got a template and somehow sold it
- Dick Bayer: Word of caution, DBIA, Green Building Council, an association will get initial excitement, last stages are search for guilty, punish the innocent, staff, office, the innovation stops, we are afraid of that, we don't want to generate a revenue model, we want to generate innovation that transforms the industry
- Greg Howell: We did not want to be of the staff, for the staff, one of the consequences is we won the prize for the worst managed organization in the world, it's embarrassing to say this, we became successful and got smacked in the head with that, we ought to be cautious about our purpose, these are all seductive ideas, we still want to be cautious about this
- Dick Bayer: We should thank John Koga for that value facet, education function, is it valuable to us, worth the cost
- Janette K: It's too late to go back into the closet, engineer and lawyer, looked at TQM, Alliancing, nothing comes as powerful as what I just see in the last 6 months, why is it that I never found out about it, change the industry to build competitiveness into the U.S.
- Will Lichtig: The Board is dealing with how to transform the industry given our current resources? How do we generate revenue for this? How do we avoid getting bound by our revenue streams?
- Greg Howell: Almost all other organizations have advocacy for their constituents point of view, we're kind of cool, maybe with exception of DBIA (change the law and practice), we need
- Kevin Lebreque: There's a very open culture in LCI, you have all companies getting up and talking to each other, that's part of the value here, if anyone tries to dominate, then others may shy away
- Larry R: I've been to Cincinnati, doing lean in manufacturing since 1997, the transformation that's occurring for construction is not what's happening in manufacturing, it may allow the U.S. to be competitive as a whole, it's all about company leadership, 90% of presidents and CEOs don't have a clue, if lean doesn't start at the top, it ain't gonna go anywhere, we suffer the same problem in manufacturing, leadership presentations they were primarily about how to use lean in project, you have to transform individual companies too
- Jack Avery: On USGBC Board for Education, education was a big thing, standard curriculum for intros, do we need to work on that, so it's not a burden on Greg or Glenn, got to be careful about that education
- Dick Bayer: Yes, we're standardizing because there's lot of competition
- Frank Barnes: Little books, something simple to read and share, educational series
- Jorge Izquierdo: Find on the website the templates other companies do, presentations for today and prior Congress, I suggest that the prerequisite is that to download, you have to upload something, to multiply our efforts
- Fritz G: Alan has started – more information in a central place, they always ask show me success, we need more real metrics, we have improve a lot, a better culture, to win over more people, this metrics collection is a full-time job
- Will Lichtig: We've put Christine Pasquire in touch with Chad Walker of CURT to get coherence in collecting the right data and a coherent way of expressing to the community of what they have found
- David Trent: The metric direction is different, we're working on that, comparing unit rate of improvement to unit reliability, Cynthia and I are talking seriously about this metric issue, they are all that, how many can you attribute it to lean? What you can do, is use same metrics, trust there is stuff going on in the area of metrics, there's a whole lot of knowledge, if you have a metric you want us to present to CURT, I'm concerned about reinventing the wheel, when it's not about
- David Trent: I'd like to switch topics to next year's conference



- Will Lichtig: Board is planning to prepare 20 documentable projects that demonstrate the value of lean, we need to align better with academia to complete this effort
- Alan Mossman: Ken Walsh has offered to be specialty editor for issue of Lean Construction Journal to have papers about projects that demonstrate that lean works
- Dick Bayer: In general spreading the message takes substantial resources. Let's go to David's comment.
- Meeting location choice:
 - Go where the action already is
 - Strategic choice to go somewhere to develop lean construction community

=== END OF MEETING NOTES ===

NEXT LCI CONGRESS

- David Trent: I don't think Greg should be the IT guy. LCI makes spec about IT needs, give it out to bid, spec together so we don't have to have our leadership physically working, I don't want Greg to be working on the IT, it won't cost us that much more, we really have to, take it up a notch
- Greg Howell: Opportunities to pay great attention that's occurring at the chapters, one of the presentations came from the chapter level (Jeff Guizio), use the chapters as a resource, really make sure we go after them, we don't have strong local connections, we need to collect those, maybe some are rough but they are a gem waiting to be polished
- Standardized presentation format might get rid of the IT problems
- Jack Avery: More time at front end talking about what LCI accomplished last year, highlights, initiatives, some graphs, PowerPoints, what's the Board
- Alan Mossman: At end we should be talking about the results we're planning to create for the next 12 months as individuals
- Dave Hagan: Not just be a champion for a presentation
- Dick Bayer: What is one thing you will take back to your job the next day?
- Will Lichtig: Have the right purpose for our meeting. Maybe we have a day for all members.
- Alan Mossman: Have it virtually
- Dick Bayer: Have a members meeting in some format. Maybe we plan Days 2 and 3, then save Day 4 for late-breaking.
- Jack Avery: It will help us with getting approval for travel.
- I didn't know what was going to happen on Days 2, 3, and 4.
- David Trent: Have an executive level meeting to help educate upper management about this. Bring in the executives to encourage more support.
- Dick Bayer: We're working on standardizing presentations, maybe we can break into that an executive level
- Alex Lichtig: Executive = golf tournament!
- Jack Avery: Shorter presentations, rapid fire celebrations
- Cynthia Tsao: pecha-kucha
- Frank Barnes: Jamaica is a great venue, golf courses, for the next Congress
- Alan Mossman: All our projects will be all sizes

(Cynthia Tsao stops recording. Alan Mossman takes over.)