WESTERN SYDNEY
UNIVERSITY

Centre for
Smart Modern Construction

c4SMC INTER-UNIVERSITY ACADEMIC ROUND TABLE

14th November 2018

Reinventing OSCM & the role of Lean Thinking

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OVERVIEW

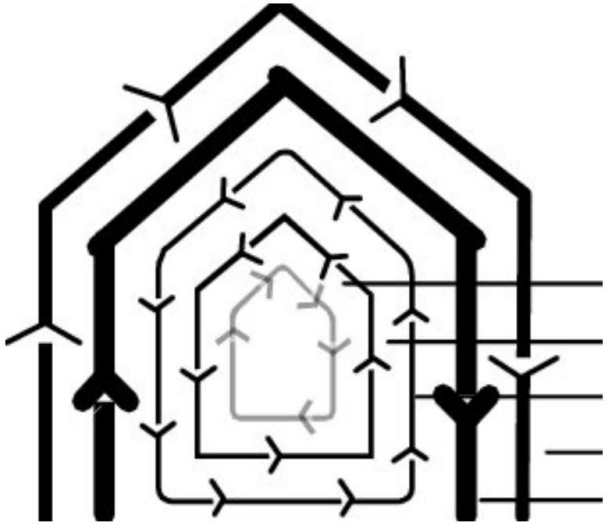
1. Introduction—the opportunity for Universities
2. History revisited: 1st wave 1960-80: 2nd wave post 1980
3. issues for OSCM
4. Challenges for universities—your tacit contract with the public
5. The potential of Lean Quality
6. Lean quality driving change

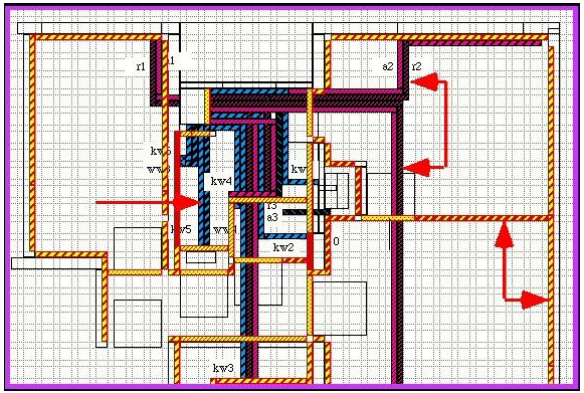
EVRY ESSONE-PARIS NEW TOWN BUILT 1960S IGECO

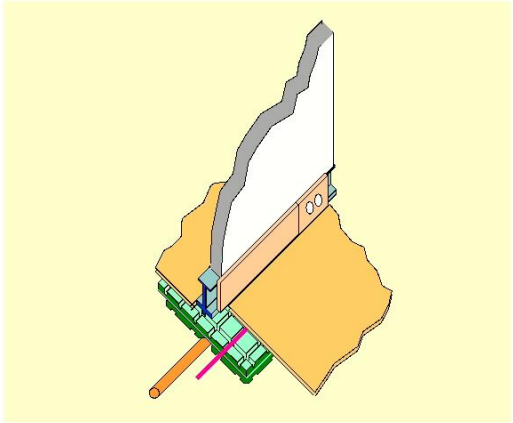
ERNST GOHNER AG SWISS VILLAGES FROM MOBILE FACTORY

HABITAT 67 MONTREAL—MOSHE SAFDIE: EXPO 67

2nd Wave thinkers—Brandt, Habraken



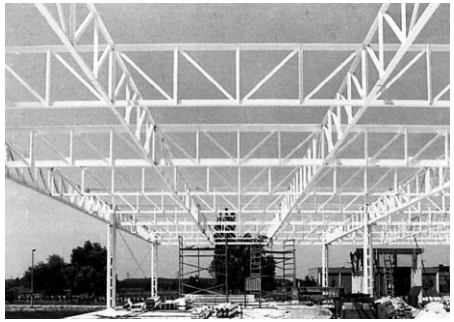




2nd Wave products:

- Haller
- Henggeler
- Peikert
- Project homes
- The modern office building

FRITZ HALLER-USM; MINI, MIDI AND MAXI & FURNITURE



Conextech—the hive concept

SUMMARY

- First wave of OSCM—Post WWII 1960—77: Mass production
  - Huge demand and a shattered industry
  - Design and production was manufacturing led
  - On projects with >1,000 dwellings a 10% saving was realised
  - The product was boring and rejected by consumers
  - Experimentation Habitat and
- Second wave of OSCM—post 2000: mass customization
  - Brandt, Habraken, Henggeler, Peikert
  - Light and heavy weight material alternatives—modules and panels
  - Flexible design for adaptable through WOL

CHALLENGES FOR UNIVERSITY EDUCATORS

- Your tacit contract with society
- Shaping the future rather than reteaching the past
- Lean quality—NOT just compliance but innovation and improvement
- **Lean Thinking** drives a continuous search for improvement

THE PURPOSE OF LEAN

To **continuously** improve

customer service &

product quality

Lean applies to everything

DISPELLING SOME MYTHS

1. Lean is a set of **tools**
2. Lean is the elimination of **waste**—whose waste?
3. Lean applies to **repetitive** processes

Lean is a framework for thinking about everything

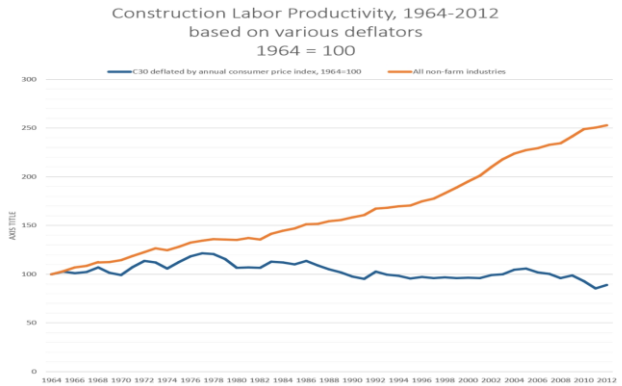
THE HALLMARK OF A LEAN ORGANISATION

plans are realised

+

each week is an improvement on the last

yet BAU =

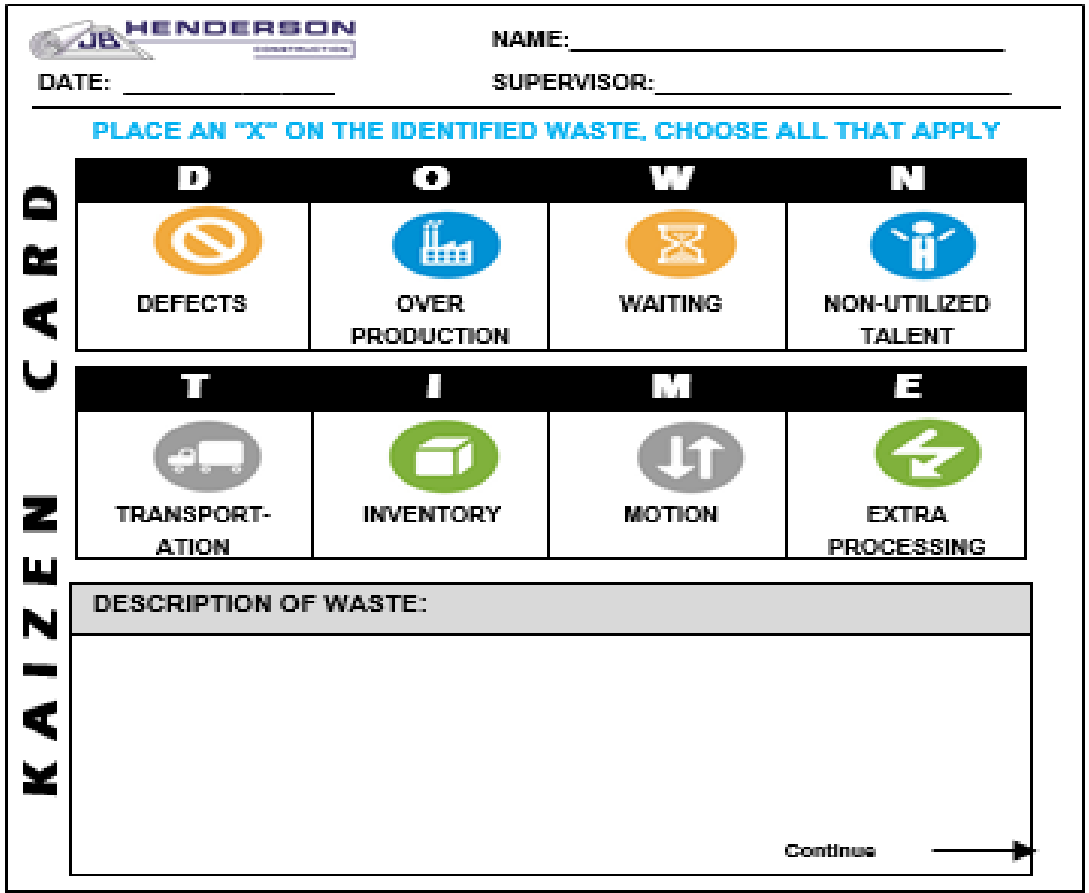


HOW DO LEAN ORGANISATIONS DRIVE CHANGE?

THEY

- **Understand** their customers – **feedback**
- Constantly **scan and adopt** best technologies
- Strive to **eliminate the RIGHT waste**
- Drive improvement **from the shop floor**
- **Measure performance**
- **Learn** from every **mistake**

WORKERS FIND WASTE—JBH



STANDARDISE + ORGANISE

DPR USE OF BIM TECHNOLOGY

IDEAS FROM THE SHOP FLOOR—SOUTHLAND

- **Workers share 2 minute videos** of successful innovative ideas

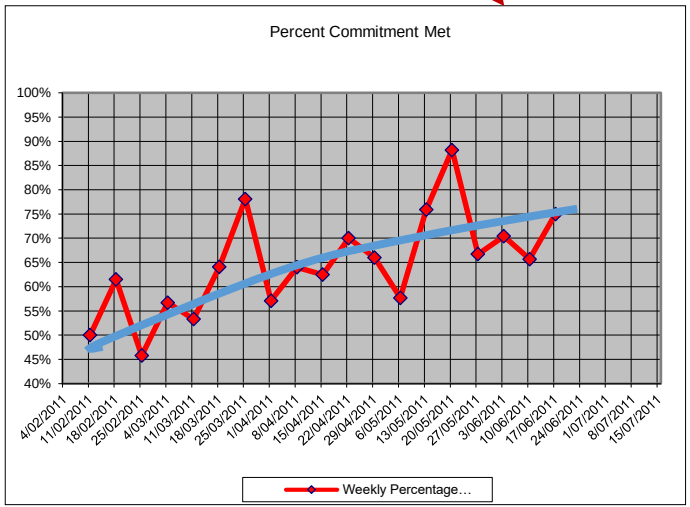
- Photo shows **customised trolley** for moving unpacked WC pans to site;
- Packaging does not even get to site

VISUAL WORKPLACE

Interactive problem solving

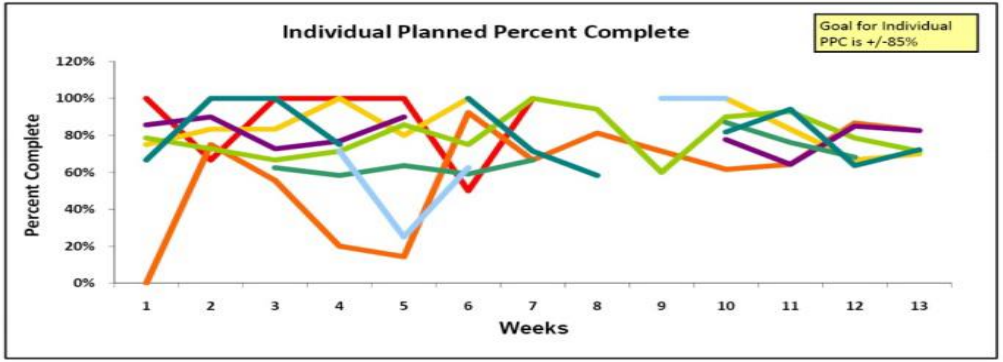
Oversight of a program of work

Charting performance

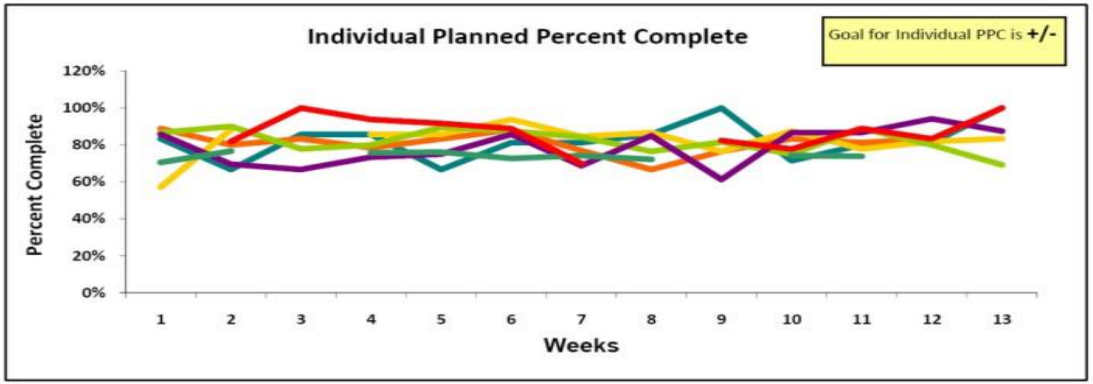


BOULDER ASSOCIATES-ARCHITECTS
COMMITMENT RELIABILITY

First 3 months



Second 3 months



marosszeky associates

CASE STUDY BAKER CONCRETE

THYSSENKRUPP
$3.7bn project

BAKER CONCRETE
Compared LEAN
to BAU

the lean team……

- Safety 65% ⬇ Baker norm
- Formwork **rental** ⬇ 75%
- Equipment **rental** ⬇ 29%
- Formwork **productivity** walls ⬆ 29% columns ⬆ 61%
- Overall **labour productivity** ⬆ 12%
- **19% faster** than plan

Baker built 2 buildings side by side and compared performance between **Business as Usual** and **LEAN**

SUTTER $309M EDEN MEDICAL CENTER—2012

- Ahead on schedule
- Under budget
- 30% less site time
- Labour productivity up 6%
  - And 5-20% above trade baselines
- Rework 15-80% below baselines
- Mech/Hydraulic to the model 99%
- Electrical to the model 71%
- Framing to the model 79%
- Fewer RFI's & Change Orders
- Fewer failed inspections

From Glenn Ballard P2SL

LEAN THINKING DRIVING CHANGE EDUCATION AND PRACTICE

- Differing levels of collaboration—Integrated Project Delivery IPD
- Designing to a cost— Target Value Design TVD
- Finding ideas to drive innovation—Value Stream Mapping VSM
- Work as a result of language—Collaborative planning LPS
- A taxonomy of waste—Waste identification
- Trial and refine before build—Prototyping
- Capture attention, focus on performance—Visual management
- Everyone with the same 3D information—BIM on site

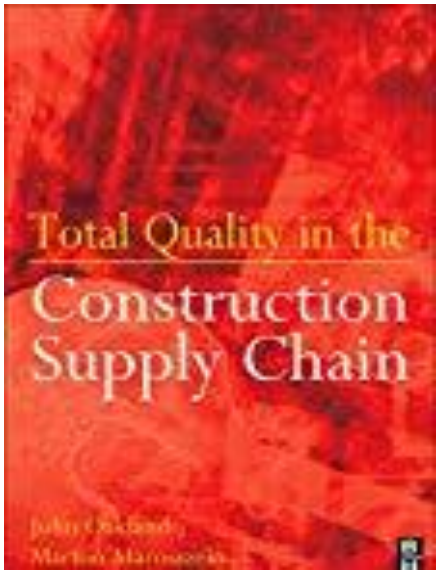
LEAN—QUALITY

- The industry is broken
  - Neither clients or contractors effectively extract value from their suppliers
  - All parties simply buy better hammers—but who is cracking the industry nut—NO ONE
- A framework for driving change at every level
  - Industry
  - Enterprise
  - Project

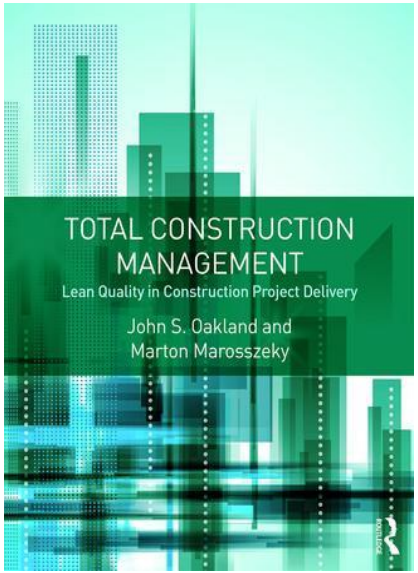
CRITICAL ISSUES FOR CONSTRUCTION BUSINESSES

- **Educated clients vs product customers**
- OSCM needs a **pipeline** of work
- Clarity about **risk allocation**
- Revisioning **GC and SC roles**
- **Technology adoption**
- **User centric** initial & WOL flexibility
- **User centric** initial & WOL flexibility
- Investment in planning **up front**
- **End to end** supply chain innovation
- **LOGISTICS**—local and global
- Systems **integration**
- Develop all parts **in sync**
- Minimum **time on site**
- **Standards & financier acceptance**

TOTAL QUALITY
in the Construction Supply Chain—2006



TOTAL CONSTRUCTION MANAGEMENT
Lean Quality in Construction Project Delivery—2016



25 case studies of extraordinary enterprises and projects