WHAT IS LEAN?

Production practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination.

Term credited to John Krafcik in 1988.

WHAT IS LEAN?

Manufacturing Processes

Craft Production
Mass Production
Lean Production

½ human effort
½ space
½ investment in tools
½ the hours
WHAT DID TOYOTA TEACH US?

Philosophy  *  Process  *  People  *  Partners

Culture is most important- not tools. It is a journey.
Understanding your process will enable value decisions.
People doing the work are the most capable of improving it.
The relationship with your extended partners affects your results.

* Philosophy: Continuous Improvement, Make the work flow, Engage the workforce, Assure Quality, Standard Work, Visual Management, Workplace Organisation

* Process: Radiation Treatment Services

* People: Teamwork, Diversity

* Partners: Building, Office
Lean Thinking

“It provides a way to specify value, line up value creating actions in the best sequence, conduct these activities without interruptions whenever someone requests them, and perform them more and more efficiently. In short lean thinking provides a way to do more and more with less and less- less human effort, less equipment, less time, less space- while coming closer and closer to providing customers with exactly what they want.” Womack & Jones “Lean Thinking”

Lean process improvement in healthcare

The engagement of employees & physicians to eliminate waste and improve patient care flow, business, and materials processes, through work redesign. To simplify and standardize the work processes that support patient care.

Lean Definition for people who like to roll their eyes when hearing the word Lean:

We are going to strive to improve every day. We are going to improve by trying to do only tasks that add value, and trying not to do what does not add value (waste).
We do not make cars but...

Everything in life is a process and everything can be improved.

If you can't describe what you are doing as a process, you don't know what you're doing. -W. Edwards Deming
WHAT IS LEAN?

WOMACK’S FIVE LEAN PRINCIPLES

Specify Value for the End Customer
Identify the Value Stream
Make the Value Flow
Pull at the Request of a Customer
Pursue Perfection Relentlessly.

Pursue Perfection.
What is Waste?

Value added:

Work that the customer will pay for.
WHAT IS WASTE?
EIGHT DEADLY WASTES

- **Talent**: Underutilizing people’s talents, skills, & knowledge.
- **Inventory**: Excess products and materials not being processed.
- **Motion**: Unnecessary movements by people (e.g., walking).
- **Waiting**: Wasted time waiting for the next step in a process.
- **Transportation**: Unnecessary movements of products & materials.
- **Defects**: Efforts caused by rework, scrap, and incorrect information.
- **Overproduction**: Production that is more than needed or before it is needed.
- **Overprocessing**: More work or higher quality than is required by the customer.
EIGHT DEADLY WASTES

**Talent**
Underutilizing people’s talents, skills, and knowledge.

**Inventory**
Excess products and materials not being processed.
EIGHT DEADLY WASTES

**Motion**
Unnecessary movements by people, equipment within a process.

**Waiting**
Wasted time waiting for the next step in a process.
EIGHT DEADLY WASTES

**Transportation**
Unnecessary movements by people, equipment from process to process.

**Defects**
Efforts caused by rework, scrap, and incorrect information.
EIGHT DEADLY WASTES

**Overproduction**
Production that is more than needed or before it is needed.

**Over processing**
More work or higher quality than is required for the customer.
Current State:
Yellow = process steps,
blue = info/communication systems,
purple = waiting,
pink = kaizen burst

Future State – simplified/improved communication/information flows

smart
THE HIGH TECH TOOLS YOU WILL HAVE TO MASTER TO DO THIS

Process Maps:
Yellow: Each step in process

Blue: Technology used

Purple: Wait
Where do you see waste?

Pink: Waste

EIGHT DEADLY WASTES

- **Talent**: Underutilizing people’s talents, skills, & knowledge.
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20.0
VALUE STREAM MAPPING
DEVELOPING YOUR FUTURE CONDITION
WHAT TYPICALLY HAPPENS
IN SCOPE OF PROJECT SERVICES

Future state

Seven Flows of Healthcare
Design the Process BEFORE you Design the Space
LEAN IN OPERATIONS

LEAN OPERATIONS SHOULD SUPPORT PROGRAMMING AND DESIGN
pull planning

smart
Last Planner System

Master Schedule
Set milestones and key dates

Phase Schedule
Specify handoffs between trades

Look-Ahead Plan
Make ready and initiate re-planning as required

Feedback & Learning
Measure progress and remedy issues

Weekly Work Plan
Will Do

Progress Tracking
Doing & Done

smart
No work is done until there is a request from a customer

Production planning system designed to produce predictable work flow and rapid learning in programming, design, construction and commissioning of projects
PULL PLANNING

MAJOR STEPS

1. Milestone Pull/ Phase Pull with all stakeholders

2. Look ahead plan with appropriate frequency with your team.

3. Work plan for yourself

The secret of getting ahead is getting started. The secret of getting started is breaking your complex overwhelming tasks into small manageable tasks, and then starting on the first one. Mark Twain
How to do Value-added work

1. Have your owner/end user define value

2. Have your design/construction team tell you what they need to deliver that value

3. Just do those things...that’s it

It is not enough to do your best; you must know what to do, and then do your best. -W Edwards Deming
Make the value flow by using pull methods

We have to look at all the work required— and all the decisions our clients have to make.

We need to put them in an order that makes sense for delivering value
TEAM WORK PLANS
UNDERSTAND WORK LOAD

Visual Control at the Team Level

Projects

Team Members

Phases of work represented by color

Team members are responsible for planning their work.
design process

smart
The traditional process has many large and small hand-offs where there is potential to lose information. The end customer has no connection with the people building the facility. The people building the facility have no idea what value means to the end customer.

Discussions not just about how a department operates but how they will operate in the future does not always get translated to the design team in a traditional process. This leads to reactionary design and not innovative design.
TRADITIONAL DESIGN PROCESS

Traditional Design Process

Operational Planning Meetings → Operational Planning Meetings (May or may not continue while users are focused on design) → Transitional Planning Meetings

HANDOFF: Meet your Design Team → Pre-Design 1 → Pre-Design 2 → Pre-Design 3

FEELING DISCONNECTED?

“Don’t tell us that yet! Wait until DD...”

REDRAW!

“This information would have been helpful to know in SD...”

“VE! Redraw!!”

“Who’s drawing what here?”

HANDOFF: Meet your Consultants

Consultants: MEP, Medical Equipment, Interior Designers, Wayfinding

“I know you’ve gone over this before, but I’m new...”

HANDOFF: Production Team

“New information”

“Don’t let us do this project!!!”

HANDOFF: Subcontractors

Subcontractors

Construction

“Thank you, we’ll redraw that now”

HANDOFF: Contractor

Construction

“Hello out there...”

“We’re moving in WHEN?!”

smart
DESIGN PROCESS IMPROVEMENT

Less Linear

More Customer Focused
DESIGN PROCESS VALUE STREAM

Traditional Project
Current State

IPD Project
Current State
## DESIGN PROCESS VALUE STREAM

<table>
<thead>
<tr>
<th>MEETING 1</th>
<th>MEETING 2</th>
<th>MEETING 3</th>
<th>MEETING 4</th>
<th>MEETING 5</th>
<th>MEETING 6</th>
<th>MEETING 7</th>
<th>MEETING 8</th>
<th>MEETING 9</th>
<th>MEETING 10</th>
<th>MEETING 11</th>
<th>MEETING 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWNER</td>
<td>PROVIDE DATA / GEMBAS / SS</td>
<td>REPORT-OUT OPERATIONS</td>
<td>BUILDING BLOCK #1 / REFINED PROGRAM</td>
<td>REFINED BUBBLE DIAGRAMS / 7-FLIGHTS</td>
<td>BUILDING BLOCK #2 / FLOOR PLAN REVIEW</td>
<td>BUILDING BLOCK #3 / FLOOR PLAN REVIEW / SCENARIO PREP</td>
<td>OPERATIONAL TESTING</td>
<td>BUILDING BLOCK #4 / FLOOR PLAN &amp; RCP REVIEW</td>
<td>FINAL DESIGN REVIEW &amp; FINISH PRESENTATION</td>
<td>CELEBRATORY SIGN-OFF</td>
<td></td>
</tr>
<tr>
<td>KNOX ADVISORS</td>
<td>PRELIMINARY PROGRAM / GEMBAS</td>
<td>REFINED PROGRAM WITH FUTURE STATE</td>
<td>REFINED PROGRAM</td>
<td>FACILITATE 7 FLOWS DISCUSSION</td>
<td>PARTICIPATE IN SET-BASED REVIEW &amp; BUILDING BLOCKS</td>
<td>PARTICIPATE IN SCENARIO PREP / SET-BASED REVIEW &amp; BUILDING BLOCKS</td>
<td>PARTICIPATE IN OPERATIONAL TESTING</td>
<td>CONFIRM 7 FLOWS</td>
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<td>HKS PLANNING</td>
<td>GEMBAS VISIONING</td>
<td>GENERATE BUBBLE DIAGRAMS</td>
<td>BUILDING BLOCK #1 / STUDY STACKING</td>
<td>DEPARTMENTAL BUBBLE DIAGRAMS / STUDY STACKING</td>
<td>BUILDING BLOCK #2 / REFINED FLOOR PLANS</td>
<td>BUILDING BLOCK #3 / REFINED FLOOR PLANS</td>
<td>PARTICIPATE IN OPERATIONAL TESTING</td>
<td>BUILDING BLOCK #4 / FLOOR PLAN &amp; RCP REVIEW</td>
<td>FINAL DESIGN REVIEW - ELEVATIONS / CONFORM 7 FLOWS</td>
<td>CELEBRATORY SIGN-OFF</td>
<td></td>
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<tr>
<td>HKS INTERIORS</td>
<td>GEMBAS VISIONING</td>
<td>LISTEN / PARTICIPATE IN FUTURE STATE REPORT-OUTS</td>
<td>BUILDING BLOCK #1 / REFINED PUBLIC SPACES PROGRAM</td>
<td>DEVELOP PATIENT / FAMILY FLOW</td>
<td>BUILDING BLOCK #2</td>
<td>BUILDING BLOCK #3 / INTERIOR DESIGN PRESENTATION</td>
<td>PARTICIPATE IN OPERATIONAL TESTING</td>
<td>BUILDING BLOCK #4 / FLOOR PLAN &amp; RCP REVIEW</td>
<td>FINAL DESIGN REVIEW - FINISH PRESENTATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEP ENGINEER</td>
<td>GEMBAS</td>
<td>LISTEN / PARTICIPATE IN FUTURE STATE REPORT-OUTS</td>
<td>PROVIDE SHAFT SIZES &amp; ELECT. RRQ.</td>
<td>PRESENT MEP PARAMETERS TO USERS</td>
<td>BUILDING BLOCK #2 / MED GAS &amp; ELECTRICAL</td>
<td>BUILDING BLOCK #3 / FLOOR PLAN REVIEW</td>
<td>BUILDING BLOCK #4 / FLOOR PLAN REVIEW / LIGHTING REVIEW</td>
<td>FINAL DESIGN REVIEW</td>
<td></td>
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<tr>
<td>MEDICAL EQUIP. PLANNERS</td>
<td>GEMBAS</td>
<td>LISTEN / PARTICIPATE IN FUTURE STATE REPORT-OUTS</td>
<td>BUILDING BLOCK ROOMS #1</td>
<td>PREP FOR BUILDING BLOCK #2</td>
<td>BUILDING BLOCK #3 / FLOOR PLAN REVIEW</td>
<td>BUILDING BLOCK #4 / FLOOR PLAN REVIEW &amp; stellt MOUNTED EQUIP. REVIEW</td>
<td>FINAL MEDICAL EQUIPMENT REVIEW</td>
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<td>IT</td>
<td>LISTEN / PARTICIPATE IN FUTURE STATE REPORT-OUTS</td>
<td>PROVIDE HKS / KNOX WITH DATA CLOSET REG.</td>
<td>PRESENT IT PARAMETERS TO USERS</td>
<td>FUTURE STATE TECHNOLOGY PRESENTATION</td>
<td>BUILDING BLOCK #3 / FLOOR PLAN REVIEW</td>
<td>PARTICIPATE IN OPERATIONAL TESTING</td>
<td>BUILDING BLOCK #4 / FLOOR PLAN &amp; CSTD MOUNTED DEVICE REVIEW</td>
<td>FINAL DESIGN REVIEW</td>
<td></td>
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</tr>
</tbody>
</table>

*smart*
DESIGN PROCESS VALUE STREAM
DESIGN PROCESS BIG CHANGES

Stop and Listen before you draw.

What is value to the end customer?

What is our customer’s future state?

Design to our customer’s level of understanding
DESIGN PROCESS BIG CHANGES

- Estimate Continuously
- Less Hand offs
- Trade Partner Collaboration if possible
- Design is iterative- shorten the iterations
- Take out batches
## Project Value Stream

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-Feb-14</td>
<td>Confirm meeting times with Ortho Physicians Schedule Field Trips.</td>
</tr>
<tr>
<td>3-Mar-14</td>
<td>Participate - Workshop 1 / Relocate 2C Storage</td>
</tr>
<tr>
<td>10-Mar-14</td>
<td>Participate - Workshop 2 / Relocate 2C Storage</td>
</tr>
<tr>
<td>17-Mar-14</td>
<td>Participate - Workshop 3 / Relocate 2C Storage</td>
</tr>
<tr>
<td>24-Mar-14</td>
<td>Participate - Workshop 4 / Relocate 2C Storage</td>
</tr>
<tr>
<td>31-Mar-14</td>
<td>Participate - Workshop 5 / Relocate 2C Storage</td>
</tr>
<tr>
<td>7-Apr-14</td>
<td>Review and provide detailed information for rooms. Review and approve door functions.</td>
</tr>
<tr>
<td>14-Apr-14</td>
<td>Sign Off</td>
</tr>
</tbody>
</table>

### TSRHC

- **TSRHC Major Decision Points**

### HKS

- **Design Workshop 1:** Visioning Round Table Discussion
- **Design Workshop 2:** Response to Visioning - conceptual diagrams, imagery, fine-tuned space program
- **Design Workshop 3:** Set-based design Round 2 - walls and doors, multiple options. Possible mock-ups of key rooms.
- **Design Workshop 4:** Set-based design Round 2 - walls and doors. Discuss detail in typical rooms.
- **Design Workshop 5:** Detailed Design review populated key rooms, add additional detail

---

**Sign Off**

**Final Equipment List**

**Door Hardware Meeting with BECK**

---

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PROJECT VALUE STREAM
CASE STUDY: AKRON CHILDREN’S HOSPITAL

Design for Operations

Lower cost by over 20% without reducing scope.
Final construction cost was $97.9 million
  • $1.7 million in savings pool
  • $7 million in value adds

Project delivered first week in December despite 87 rain days

No punch list at owner turn over

190 rfi’s
  • 40 related to early steel package
  • many were confirming

$1.4 million in change orders
  • $1.1 million was owner driven

Rework greatly minimized through collaborative efforts
High Condition of Satisfaction Scores throughout the project.

We have over $8 Million Dollars in the Project Reserve

We provided the construction and equipment for 2 additional Hybrid Ors and a Cath Lab over the original scope.

We designed and constructed a registration area and family space above the original scope.

We designed for operations
Gee Thanks!
You've Been Swell!