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LEAN THOUGHTS

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7 Wastes of Design

I have taken the following insightful article from the newsletter of the Industrial Technology Centre Advanced Manufacturing News, Canada

You ALL know already - the theme of lean is to identify and eliminate waste in the value stream and throughout all parts of the organization.

Usually, the areas that are concentrated upon are on the manufacturing floor. However, many times the wastes found are a result of poor designs. I'm sure that this poor design is not intentional. But it is an indication that the "down stream customer," whether it's the internal manufacturing customer or the external end-user, may not have been carefully considered during the design process. So, there has to be a process for the designer to receive feedback early in the design phase, not a year later, after production has already taken place, so that the product is manufactured "right the first time."

Taiichi Ohno first outlined the concept of the seven wastes almost 50 years ago, recognizing that waste drives up cost. The seven wastes are inherent in ALL processes. In a recent article in *Lean Directions*, the authors identify how the seven wastes relate to product design. They suggest that in order to design-in lean principles, "designers and engineers must make lean thinking second nature." They need to essentially "see" the seven wastes on the factory floor for what they are – a result of the product design. Seeing the waste will help them recognize the behaviors and tactics that create the waste.

Design Wastes

1. **Overproduction** – is the "waste of producing a product, service, or information before the customer needs it, or producing more than is needed." How does design contribute to this waste? By: Expanding the scope of the requirements (adding features that aren't tied to customer or market requirements)
   - Including too many options or details on how to test or make the product, dictating the manufacturing process
   - Creating designs that require batch production; i.e. specialized materials, sole source, high-cost setup, low yield

2. **Transportation** – is movement of products or materials or information that does not add value. Product design contributes to this waste by:
   - Not considering how large, heavy, or awkward items will be handled in production
   - Creating design with multiple parts that could have been simpler
   - Specifying parts that require purchasing from a great distance away

3. **Motion** – is movement that doesn't add value – searching, walking, sorting, bending, etc. Design can contribute to motion waste by:
   - Not creating "open" designs for easy use, requiring repetitive motion in manufacturing or maintenance.
   - Creating designs that are not easily oriented for use, maintenance, manufacturing; lack of symmetry requires more motion in production.

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Where "Lean Thoughts" Become Reality

4. **Waiting** – is "idle time in manufacturing created when material, information, people, or equipment is not ready." Product design can cause waiting downstream by:
- Testing and verifying at the wrong level for process feedback and correction.
- Delaying production due to incomplete or inaccurate information
- "Design programs strive for zero risk and are therefore never quite done for the required schedules."
- Creating designs that don't anticipate improvements, such as the insertion of technology.

5. **Overprocessing** – is effort that adds no value from the customer's view. Analyzing, inspecting, validating, multiple machining or assembly are symptoms of overprocessing waste. The product's design can generate this waste by:
- Creating designs without thought for the production process, attempting to meet "over-specified precision."
- Specifying and requiring source control that add no value and are limiting.
- Creating complex designs requiring complex manufacturing processes.

6. **Inventory** – is more materials or information than is needed to serve the customer right now. Part costs include more than material and labour for manufacturing it. Costs are also associated with material handling and purchasing, data processing, manufacturing engineering, QA, inventory control, warehousing, etc.

7. **Defects** – are work that contains errors, mistakes, or lacks something. This waste is usually obvious – it requires rework, analysis, problem solving, fighting fires, scrapping. Design has the greatest impact and potential for correction and savings in this area. A badly designed part is one that can be:
- assembled wrong
- used incorrectly
- has missing design data
- requires precision or tight tolerances resulting in low yields
- doesn't meet customer requirements

…resulting in creating waste.

Yesterday's "fix it later" has become "right the first time" or "first unit correct," which results in rapid time-to-market.

Source: Industrial Technology Centre Advanced Manufacturing News, Canada

YouTube Peeks Into Factories

From the Evolving Excellence Newsletter

You may be unaware of the phenomenom called **YouTube**. This free website lets users post videos (with strict rules, so for the most part they are "work safe"), then anyone can search and view them. The service has been so popular that it now ranks among the top five on the internet and consumes almost **200 terabytes of bandwidth per day**. That's over 100 million minutes of downloaded videos per day... which is probably enough wasted time to actually have an impact on the GDP.

So why make it a waste? There has to be some value buried within the millions of videos already uploaded. Yep... a quick search on "manufacturing" turned up 585 videos and "factory" returned 4,664 results. Many won't end up being relevant, but some can be. Below are some examples I found on the first couple pages of results... click on the photo to play it in the blog, or click on the "full size" link to open it in a larger new window. You may have to click the photo twice to start the video.

How Duct Tape Is Made - 3:51

Link to full size video

Paul Reed Smith Guitar Factory Tour- 3:00

Link to full size video

The Future of Manufacturing - 1:34
Jack Shaw talks about lights out manufacturing at SAP Brazil 2006

Link to full size video

Ford Manufacturing Supply Chain Management - 4:57
Cisco promotional video on supply chain technology

Link to full size video

Tour **W**orkshop **C**onference

Consortium Event Schedule

January

T

Wednesday 25
Eaton Electrical,
contact Joe Fisher,
JoeRFisher@eaton.com

February

T

Wednesday 15,
CFN Precision,
contact Barry Wood, bwood@cfn-inc.com

W

Date & location TBA
Your own "STEP Diagnostic" to create Vision, Mission and Direction
Contact Richard Kunst
Richard.kunst@la-z-boy.com

March

T

Wednesday 22,
Nestle Waters,
contact Mariela Castano
mcastano@perriergroup.com

April

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Wednesday 19,
CTS Corp.,
contact Bob Garces,
Bob.Garces@ac.ctscorp.com

Consortium Shareshowcase
Saturday 29
Kraft Oakville.
Contact Cindy Grolleman
cindy.grolleman@stackpole.com

May

T

Wednesday 17,
Stackpole CSD,
contact Don Barber
Don.Barber@stackpole.ca

W

Date & location TBA
"Compartmentalize the Noise"
*** Daily Report-outs**
*** Standard work for Leaders**
Contact Richard Kunst
Richard.kunst@la-z-boy.com

June

T

Wednesday 21,
Morrison LaMothe,
contact Tony Vita
tvita@morrisonlamthe.com

C

AME Regional Conference
Mon 12 to Thurs 15
K-W Ontario
Contact www.ame.org

July

August

W

Date & location TBA
"Establish Anchors"
*** VSWI … Visual Work Instructions**
*** TPM … Total Productive Maintenance**
Contact Richard Kunst
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September

T

Wednesday 20,
Kraft Foods,
contact Hanif Jivraj
hjivraj@Kraft.com

October

T

Wednesday 11,
Stackpole PMC,
contact Cindy Grolleman
cindy.grolleman@stackpole.com

C

AME National Conference
Mon 16 to Friday 20
Dallas, Texas
Contact www.ame.org

November

T

Wednesday 15,
Messier-Dowty,
contact Mike Smith
Mike.Smith@Messier-dowty.on.ca

W

Date & location TBA
Your own "Get Organized"
*** 5S+1**
Contact Richard Kunst
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December