Best Practices and Tools For Using Standards In Your Lean Process
Georges Bishop works with both management and unions in addressing Work Measurement and Engineered Labor Standards issues, and is a recognized expert witness in the field. George also acts as a mediator and arbitrator to resolve Engineered Labor Standards issues that exist between the parties. His consulting experience extends over many industrial sectors, with extensive experience in manufacturing, delivery, distribution and retail operations. George is a certified MOST® trainer who taught Work Measurement and Methods Engineering at the undergraduate and graduate levels at both l’École Polytechnique de Montréal and l’Université de Sherbrooke. He has published articles on Work Measurement and Engineered Labor Standards and is regularly asked to speak at international conferences and Union symposiums on these subjects. Georges published a series of articles for ISE Magazine that promote Work Measurement and Engineered Labor Standards as an essential tool for industrial engineers.

- **Expert witness:**
  - Georges has testified on behalf of both companies and unions on more than 15 occasions in civil, criminal and labor litigation. His expertise is very often at the core of the arbitrator’s decision.

- **Arbitrator:**
  - Georges acts as a mediator and arbitrator in technical litigations that center around work measurement, performance measurement and engineered labor standards implementations.

- **Labor Management Systems:**
  - Twenty-five years ago, Georges engineered the deployment of engineered labor standards across the entire Canadian grocery distribution network. Subsequently, Georges carved the labor management strategy of some of the largest food distributors in North America. Georges is also a pioneer in the development of Discrete Labor Management Systems (DLMS) for distribution environments.
Contents

Engineered Labor Standards ("ELS")
Why & When To Use ELS
Work Measurement Workflow
“We can see and feel the waste of material things. Awkward, inefficient, or ill directed movements of men, however, leave nothing visible or tangible behind them.”

Frederick Winslow Taylor

- Improve
  - Tools
  - Methods
  - Management practices
- Measure the potential of the improved process
  - Set clear productivity goals
  - Manage to these goals
- Incentivize the employees
  - Create a win-win incentive program
  - Motivate employees to achieve greater levels of productivity
Engineered Labor Standards – Improve, Measure, Incentivize

**Incentivize**
- Incentives
- Activity Based Compensation

**Measure**
- ELS

**Improve**
- Lean
- Continuous Process Improvement
- Methods Engineering
Engineered Labor Standards – The concept of Work Study

Work study is a generic term for those techniques, particularly **method study** and **work measurement**, which are used in the examination of human work in all its contexts, and which lead systematically to the investigation of all the factors which affect the efficiency and economy of the situation being reviewed, in order to effect improvement.

International Labour Office (“ILO”)
Engineered Labor Standards – The ELS maintenance and update cycle

Maintenance / Update

Measure
Current Process
Revised Process
Process Improvement

Health & Safety
Quality
Productivity

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Work Measurement is the application of techniques designed to establish the time for a qualified worker to carry out a specified job at a defined level of performance.

ILO
Work Measurement is the application of techniques designed to establish the time for a qualified worker to carry out a specified job at a defined level of performance.

ILO

- Time Study
- Predetermined Motion Time System
- Work Sampling
- Standard Data
Engineered Labor Standards – A definition of Work Measurement

Work Measurement is the application of techniques designed to establish the time for a **qualified worker** to carry out a specified job at a defined level of performance.

- Mental Abilities
- Physical Abilities
- Sufficient Practice

ILO
Engineered Labor Standards – A definition of Work Measurement

Work Measurement is the application of techniques designed to establish the time for a qualified worker to carry out a **specified job** at a defined level of performance.

ILO

- Methods
- Health & Safety
- Quality
- Adherence to the SOP
Engineered Labor Standards – A definition of Work Measurement

Work Measurement is the application of techniques designed to establish the time for a qualified worker to carry out a specified job at a defined level of performance.

- Fair Day’s Work
- Incentive Pace Work

ILO
## Engineered Labor Standards – Work Measurement options

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predetermined Motion Time System (PMTS)</td>
<td>Indirect measurement of the element’s time by associating industry recognized predetermined time to the motions required to accomplish this work element. Several systems are available; the most commons being MOST, MTM, MODAPT.</td>
<td>• Manual elements&lt;br&gt;• Cognitive elements</td>
</tr>
<tr>
<td>Time Study</td>
<td>Direct measurement of time using a timing device and assessment of observed pace of a work element.</td>
<td>• Machine elements&lt;br&gt;• Process times&lt;br&gt;• Equipment travel&lt;br&gt;• Manual element&lt;br&gt;• Cognitive elements</td>
</tr>
<tr>
<td>Work Sampling</td>
<td>Direct observation and measurement of the frequency of work activities.</td>
<td>• Unavoidable delays</td>
</tr>
</tbody>
</table>
“Standard time is the **total time** in which a job should be completed at **standard performance**.

Standard performance is the rate of output which qualified workers will naturally achieve without overexertion as an average over the working day or shift, provided that they know and adhere to the specified method.”

ILO
Contents

Engineered Labor Standards ("ELS")

Why & When To Use ELS

Work Measurement Workflow
Why and When To Use ELS – Information system

• Work Measurement is an information system that provides accurate times to:
  • plan;
  • establish production costs;
  • measure efficiency.

• The flexibility of Work Measurement enables it to be used throughout the supply chain.
  • Manufacturing operations
  • Transport and Delivery
  • Distribution operations
  • Retail operations
  • Service industry
Why and When To Use ELS – Breaking the stigma
Why and When To Use ELS – When should ELS be part of your process?

Product/Service Design
- Ease of fabrication
- Ease of assembly

Process Design
- Methods
- Layouts
- Flow
- Training Material

Production
- Learning curve
- Scheduling & Planning
- Accountability
- Optimization
Why and When To Use ELS – Maximizing results / Minimizing overall development cost
Why and When To Use ELS – Identifying the lost opportunity

INCENTIVE OPPORTUNITY ZONE

100% of ELS

Focus on process improvement + ELS

LOST OPPORTUNITY

Focus only on process improvement

Time from start of production
Engineered Labor Standards ("ELS")
Why & When To Use ELS
Work Measurement Workflow
Work Measurement Workflow – Overview

Standardized Process → Element 1 → Element 2 → Element 3 → …

Standard Data → Predetermined Motion Time System → Normal Time

Predetermined Motion Time System

Time Study

Normal Time → PF&D or RPN&D → Standard Time

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Work Measurement Workflow – Elemental approach

- Foundation for building Standard Data
- Facilitates leveling the observations
- Enables a more accurate calculation of the allowances
- Facilitates maintenance of the standards
- Segregates the elements according to their frequency, nature, and type
- Clearly identifies *Start* and *End* points of each element

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Identifies the frequency of an element with regards to the overall task.</td>
<td>• Repetitive&lt;br&gt;• Non-Repetitive&lt;br&gt;• Foreign</td>
</tr>
<tr>
<td>Nature</td>
<td>Relates to whether the time of the element is a constant or if it is relative to a certain attribute (e.g. distance, weight, area)</td>
<td>• Constant time&lt;br&gt;• Variable time</td>
</tr>
<tr>
<td>Type</td>
<td>Addresses the level of control an operator has over the elemental time</td>
<td>• Manual&lt;br&gt;• Machine/Process&lt;br&gt;• Process driven</td>
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</table>
Work Measurement Workflow – Conventional approach

1. **Create Element List**
   - *Spreadsheet*

2. **Retrieve Master Element List**
   - *Corporate spreadsheet*
   - *Shared drive, Sharepoint*

3. **Find Element**
   - T.S. or PMTS

4. **Build with T.S.**

5. **Build with PMTS**

6. **T.S. or PMTS**

7. **Copy Element T&V Form**
   - *Summary spreadsheet*

8. **Update Master Element List**

9. **Create Element Allowances**
   - *Summary spreadsheet*

10. **Enter Element Frequencies**
    - *Summary spreadsheet*

11. **More Elements?**
    - Yes: Go to step 9
    - No: Go to step 12

12. **Standard Completed**
   - *Summary spreadsheet*
Work Measurement Workflow – Shortcomings of the conventional approach

- Does not promote concurrent engineering
  - Difficult to accommodate engineering group / department
  - Hard to keep updated version of the data available to all at all times
  - Duplication / Variants of elements often found

- Not effective in highly changing environments
  - High Mix – Low Volume
  - When an iterative process is required (e.g. product development, method design)

- Not optimal for deployment scenarios such as multi site implementations
  - Lack of consistency in the standard
  - Can result in industrial relations issues in unionized environments
Work Measurement Workflow – A more integrated workflow is the solution

• Create a structured workflow
  • Promotes consistency at various levels (e.g. time study, PMTS, allowance calculations)
  • Improves overall quality of the standards
  • Facilitates training of engineering resources

• Enables concurrent engineering through a centralized database
  • Real-time update
  • Tracks element usage

• Integrates the Work Measurement tools into the workflow
  • Time Study capture device interface
  • Speed measurement radar interface
  • PMTS development interface
  • Shortens the Work Measurement process
Work Measurement Workflow – A more integrated and agile workflow
Work Measurement Workflow – More efficient Time Study process

1. Create observation form
   - Paper based

2. Take preliminary observations (n’≈10)
   - Stopwatch Observation Form

3. Compute required sample n
   - Spreadsheet Data Entry

4. Take remaining observations
   - Stopwatch Observation form

5. Validate data
   - Spreadsheet Data entry
   - Control chart

6. Summarize data
   - Spreadsheet

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Create template
- UMT Manager

Take observations
- UMT+
  - Android, iOS
  - Real time n

Validate and summarize data
- Stat UMT

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Work Measurement Workflow – More efficient Time Study process

Create template
UMT Manager

Take observations
UMT + Android, iOS Real time

Validate and summarize data
Stat UMT
Work Measurement Workflow – Real-time centralized elemental data
Work Measurement Workflow – Document the ELS as you build elements
Work Measurement Workflow – Integration with time data capture devices
Work Measurement Workflow – Streamlined Time Study
Work Measurement Workflow – Integrated PMTS analysis
Work Measurement Workflow – Rest & Personal Need Allowances
### Work Measurement Workflow – Standard summary

<table>
<thead>
<tr>
<th>Element</th>
<th>Normal Time (s)</th>
<th>PFA %</th>
<th>Conges. %</th>
<th>Standard Time (s)</th>
<th>Freq.</th>
<th>Duration (s)</th>
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<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>Variable</td>
<td></td>
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<td>Portable Printer</td>
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