Work Measurement Methods

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“If you’re not keeping score, you are just practicing.” - Vince Lombardi
WHAT IS WORK MEASUREMENT?

Work Measurement is determination of the length of time it should take to complete a job.
General Steps in Work Measurement

1. Measure Work
2. Factor in Performance Rating
3. Factor in Allowances (PF&D)
4. Develop Time Standards
5. Monitor, Improve, Update
WHERE DO WE USE TIME STANDARDS?

- Product Costing
- Delivery
WHERE DO WE USE TIME STANDARDS?

- Capacity Analysis

- Equipment Purchase Justification
WHERE DO WE USE TIME STANDARDS?

- Efficiency Improvement Scope and Requirement
- System Simulation
WHERE DO WE USE TIME STANDARDS?

- Labor Requirements
- Determination of Wage Payment Plans
WHERE DO WE USE TIME STANDARDS?

- Benchmarking
- Lean Six Sigma Application
WHERE DO WE USE TIME STANDARDS?

- Labor Law Compliance
- Union Contract Negotiations
LACK OF CORRECT STANDARD TIMES

- UNPREDICTABLE TIME
- UNPREDICTABLE RESULTS
- INEFFICIENT ALLOCATION OF RESOURCES
- INACCURATE OPERATION COST ESTIMATES
The Whole Picture

Lean Six Sigma Application

Work Measurement

Focus on **Time assessment and management**

Improved Production Planning & Scheduling

- Increased capability to adapt customer demand
- Reduction of manufacturing cost
- Reduction of excess inventory

Increased capability to adapt customer demand

Reduction of manufacturing cost

Reduction of excess inventory
Engineering & Lean Six Sigma Approach
PDSA Cycle
PDSA
Engineering & Lean Six Sigma Approach for Work Measurement

IDENTIFY SCOPE MODULES
- Develop Process Flow Chart
- Understand the Process
- Define Variables
- Assess Needed Resources
- Select Measurement System
- Plan Data Collection Modules

OPTIMIZE
- Identify Optimized State of Parameters
- Determine Resource Allocation
- Document Standardized Work for Future State

DO
- Plan

ACT
- Study

MEASURE
- Measure Work- Time and Motion Study Application
- Collect/Record Data
- Monitor Outputs
- Categorize the Results

ASSESS AND COMMUNICATE
- Data Analysis – Time Study
- Validate Current Approach
- Determine Resource Availability
- Communicate Results
- Build Simulation Model

IDENTIFY SCOPE MODULES
Plan

Identify Scope Modules

- Develop Process Flow Chart
- Understand the process
- Define Variables
- Determine Work Measurement approach
- Assess needed resources
- Create matrix and plan data collection phase and modules
DO

Measure

- Measure Work (time study, work sampling, etc.)
- Collect and record data
- Monitor outputs
- Categorize the results
Study Example

Assess and communicate

- Analyze the results
- Validate Current approach
- Determine resources availability
- Communicate results
- Build simulation model (static or dynamic)
Optimize

- Identify optimized state of parameters.
- Determine and recommend resource allocation, scheduling, etc.
- Document future state standardized work.
Why Work Measurement?

To:

- Assess Capabilities
- Establish Expectations
Work Measurement Methods

- Estimation
- Direct Observation & Measurement
- Predetermined Time Systems
  - SWAG
  - Historical Data
  - Time & Motion Study
  - Work Sampling
  - MODAPTS
  - MOST
  - MTM
## Which Method?

<table>
<thead>
<tr>
<th>VOLUME</th>
<th>CYCLE TIME</th>
<th>RECOMMENDED TECHNIQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000'S</td>
<td>LONG</td>
<td>Work Sampling</td>
</tr>
<tr>
<td></td>
<td>MEDIUM</td>
<td>Work Sampling, Time &amp; Motion Study</td>
</tr>
<tr>
<td></td>
<td>SHORT</td>
<td>PTSS</td>
</tr>
<tr>
<td>100'S</td>
<td>LONG</td>
<td>Work sampling, Time &amp; Motion Study</td>
</tr>
<tr>
<td></td>
<td>MEDIUM</td>
<td>Time &amp; Motion Study, Work Sampling</td>
</tr>
<tr>
<td></td>
<td>SHORT</td>
<td>PTSS, Time &amp; Motion</td>
</tr>
<tr>
<td>10'S</td>
<td>LONG</td>
<td>SWAG, Work sampling, Historical Data</td>
</tr>
<tr>
<td></td>
<td>MEDIUM</td>
<td>SWAG, Historical Data</td>
</tr>
<tr>
<td></td>
<td>SHORT</td>
<td>Time &amp; Motion Study</td>
</tr>
</tbody>
</table>
• “My employer has a implemented a lean initiative over 4 years ago, yet has only a very rudimentary time study. Actually, it is only a conversion from (inaccurate) pay rates to time.

• The result is waste has not been reduced from our manufacturing operations.” – IIE Blog
The Cost of Work Measurement

![Graph showing the cost of work measurement with points A to E, and cost of inaccuracies and total cost curves.]

- A. Stopwatch Time Study
- B. Work Sampling
- C. Multiple regression analysis
- D. Budgetary standards
- E. Historical standards

The cost of work measurement
Estimation

- Available
- Quick
- No need for formalized work measurement program
- Less costly

- Subjective
- Not a good source for time standards
- Inflated time due to delay and non-optimal performance
- Difficult to set higher goals
- Difficult to update standards
Observation

- Time & Motion Study
- Work Sampling
Time & Motion Study History

Business efficiency technique combining

**Time Study** work
(of Fredrick Winslow Taylor)

&

**Motion Study** work
(of Frank and Lillian Gilbreth)
Phases of a time study

- Analysis
- Measurement
- Synthesis
- Reporting and Standard Update
Obtain & record the following:

- Operator
- Working Conditions
- Methods
- Break Down the tasks to elements
Operator

Who do we study?

Normal

Representative & Qualified
Normal Operator

- Adapted to the work and has sufficient experience.
- Has coordinated mental and physical abilities.
- Maintains proper use of equipment and tools related to the job.
- Is cooperative.
- Performs a pace best suited for continuous performance.
(Adverse) Working Conditions

- Missing tools and equipment
- Inadequate Climate
- Mental workload
- Visual fatigue
- Low level of worker participation
- Inadequate equipment and workstation
Elements

- An **element** is a distinct part of a specified job.

- A **work cycle** is the sequence of elements which are required to perform a job.
What is the Rule of Thumb?

- The elements must be *long enough* to be accurately timed.
- The *proper method* should be used.
- Human and machine must be *separated*.
- The *end point* of each element should be consistently *detected*. 
Elements Categories

Value added
- Manual or Machine
  - Cyclic or non-cyclic
    - Fixed Time or Variable
      - Avoidable or Non-Avoidable

Non-Value Added
- Manual or Machine
  - Cyclic or non-cyclic
    - Fixed Time or Variable
      - Avoidable or Non-Avoidable

Required but Non-Value added
- Manual or Machine
  - Cyclic or Non-Cyclic
    - Fixed Time or Variable
      - Avoidable or Non-Avoidable
## Time Study Work Sheet

<table>
<thead>
<tr>
<th>Work Center</th>
<th>Engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Location</td>
</tr>
<tr>
<td>Part Number</td>
<td></td>
</tr>
<tr>
<td>Machine Number</td>
<td></td>
</tr>
<tr>
<td>Operator</td>
<td></td>
</tr>
</tbody>
</table>

### Observation

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Element</th>
<th>Category</th>
<th>TYPE</th>
<th>Operator Rating</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>V</td>
<td>MV</td>
<td>RM</td>
<td>V/MVR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Key

- **V**: Value added
- **M**: Non-value added
- **R**: Required but non-value added
- **M/MC**: Manual/Machine
- **C/N**: Cyclic or Non-Cyclic
- **F/N**: Fixed or Variable
- **AV/N**: Available or non-available

### Notes:

Takt Time: Available Time / Required Output

# of operators (operations or machine): Takt Time / Basic Time

- **Basic Time**
- **PF & D**
- **Std Time**
## Example

### Workstation Picture

![Workstation Picture](image)

### Dye Cutting Room Diagram

- **Fabric Roll**
- **Cutting Table**
- **Light**
- **Cutting Press**

### Work Element

<table>
<thead>
<tr>
<th>Work Element</th>
<th>Total Work</th>
<th>Time</th>
<th>Manual</th>
<th>Auto</th>
<th>Walk</th>
<th>Mode</th>
<th>Cycle Time in Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect fabric and package</td>
<td>22.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talk about topic</td>
<td>1.85</td>
<td>1.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make box</td>
<td>9.42</td>
<td>9.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listen to music</td>
<td>4.10</td>
<td>4.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talk</td>
<td>0.574</td>
<td>0.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count fabric</td>
<td>0.829</td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabric defect</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking and adjusting the fabric</td>
<td>6.793</td>
<td>6.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talk about fabric</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Record date and print off the label</td>
<td>2.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk and get fabric from table</td>
<td>0.06</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check new fabric roll</td>
<td>0.99</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Put box on pallet</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take box to warehouse</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Value Added
- 59%
- Non Value Added: 41%
- Required: 0%
<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Time (Min)</th>
<th>Cumulative (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Console Operations</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Tool Change (16R, 36R, 30R, 32R, 34R, 10L, 1L, 14L, 17L, 10L, 20L)</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Run Qualifier</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Inspect/Adjust</td>
<td>10</td>
<td>120</td>
</tr>
<tr>
<td>5</td>
<td>Send To CMM</td>
<td>5</td>
<td>125</td>
</tr>
<tr>
<td>6</td>
<td>Wait For CMM Results</td>
<td>55</td>
<td>180</td>
</tr>
<tr>
<td>7</td>
<td>Run Upon Approval</td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>0</td>
<td>180</td>
</tr>
</tbody>
</table>
- Observe/record the tasks
- Rate operator performance
How do we determine sample size?

- Statistical method
- Conventional method
Statistical Method of Sample Size

- Accuracy desired
- Confidence desired
- Data variability

**Formula**

\[
n = \left( \frac{40 \sqrt{n' \sum x^2 - (\sum x)^2}}{\sum x} \right)^2
\]

where
- \( n \) = sample size we wish to determine
- \( n' \) = number of readings taken in the preliminary study
- \( \Sigma \) = sum of values
- \( x \) = value of the readings.

Provide an example
### Table 28.2

Minimum number of cycles to study (Westinghouse and General Electric).

<table>
<thead>
<tr>
<th>IF</th>
<th>WESTINGHOUSE ELECTRIC VALUES (WESTINGHOUSE, 1953)</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activity/yr is under 1,000</td>
<td>Activity/yr is over 10,000</td>
</tr>
<tr>
<td>.002 h (under)</td>
<td>60</td>
<td>140</td>
</tr>
<tr>
<td>.002</td>
<td>50</td>
<td>120</td>
</tr>
<tr>
<td>.003</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>.004</td>
<td>35</td>
<td>90</td>
</tr>
<tr>
<td>.005</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>.008</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>.012</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>.020</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>.035</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>.050</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>.080</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>.120</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>.200</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>.300</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>.500</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>.800</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1.000</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2.000</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### Table 28.3

Minimum number of cycles to study (Niebel, 1992).

<table>
<thead>
<tr>
<th>IF CYCLE TIME, min (hr)</th>
<th>AND ACTIVITY IS LESS THAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,000/yr</td>
</tr>
<tr>
<td>&lt;1 (.017)</td>
<td>40</td>
</tr>
<tr>
<td>1 to 2 (.017 to .033)</td>
<td>25</td>
</tr>
<tr>
<td>2 to 5 (.033 to .083)</td>
<td>18</td>
</tr>
<tr>
<td>5 to 10 (.083 to .167)</td>
<td>15</td>
</tr>
<tr>
<td>10 to 20 (.167 to .333)</td>
<td>9</td>
</tr>
<tr>
<td>20 to 40 (.333 to .667)</td>
<td>7</td>
</tr>
<tr>
<td>40 to 60 (.667 to 1.0)</td>
<td>5</td>
</tr>
<tr>
<td>&gt;60 (1.0)</td>
<td>3</td>
</tr>
</tbody>
</table>
There are all kinds of factors that have to be considered!!!!!!

Don’t just take any observed time.
Performance Rating

- Westinghouse system
- Synthetic rating
- Pace rating
- Objective rating
How Do We Performance Rate the Operator?

Faster Operator: 110%
Normal Operator: 100%
Slower Operator: 90%
Allowances

Personal

Fatigue

Delays
• Avoidable
• Non-Avoidable
Wage and Hour Division (WHD)

FOH Field Operations Handbook

Chapter 64 Employment of Workers with Disabilities at Special Minimum Wages under Section 14(c)

Section 64101: Allowance for Nonproductive Time (PF&D) - Required only for Piece Rate Time Studies

- Defining Personal, Fatigue and Delay Factor (PF&D)
  - Normal fatigue prevents all employees from producing at their most rapid pace throughout the workday. In addition, breaks, cleanup time, and delay time while materials are being restocked or the finished products are removed all reduce the amount a worker can produce.

- Employers must take this nonproductive time into consideration when determining piece rates by including what is known as a Personal, Fatigue, and Delay (PF&D) factor. Regulations 29 CFR Part 525.12(h)(2)(i) states that when determining piece rates "appropriate time shall be allowed for personal time, fatigue, and unavoidable delays. Generally, not less than 15% allowances (9 - 10 minutes per hour) shall be used in conducting time studies."

- A properly computed piece rate will include a PF&D that also takes into account time spent by workers for traditional breaks or rest periods (ten to fifteen minute breaks). When the PF&D factor has been accurately computed, the employer need not pay additional wages for these breaks. PF&D does not include or cover "down time" as discussed in FOH 64e01(b)(1).

- Employers who fail to provide the required allowance, or provide an insufficient allowance, are at an unfair competitive advantage to employers who do give an adequate PF&D allowance. If the INV finds that a facility under investigation failed to make a proper allowance for PF&D when performing time studies to determine piece rates, that employer has most likely paid employees less than the commensurate rate and may have incurred a back wage liability under section 14(c).

- WH will not object to an employer establishing a PF&D that is greater than required by the regulations if this would result in the worker with a disability receiving wages above the applicable commensurate wage.

- The INV should determine whether the PF&D allowance used in the time study is large enough to cover all nonproductive time that constitutes hours worked (such as waiting for more materials, taking coffee breaks, or waiting while adjustments are made to machines). Even though the facility may have made an allowance, if the INV finds nonproductive work time in excess of the allowance, the facility has most likely paid employees less than the commensurate rate and may have incurred a back wage.
Direct observation

**PROS**
- Actual Observation of current practices - GEMBA
- Open dialog with people that perform the job
- Quick results
- Actual utilization of the operators
- Work Load Evaluation

**CONS**
- Requires continuous maintenance
- Does not lend itself to variety of product mix
Direct Time Study Devices

Stop Watch

Video Camera
Time Study Steps

1. **Observe and record information**
   - Operator
   - Method
   - Lay out
   - Equipment Used
   - Working Condition
   - Machine Set up (speeds & feeds)

2. **Communicate**
   - With operator
   - With Supervisor
   - All People involved in the process

3. **Divide the operation**
   - Divide Operation to Tasks
   - Break tasks into elements

4. **Determine sample size**

5. **Observe & document results**

6. **Rate the operator**

7. **Determine allowance**

8. **Develop Time Standard**
Work Sampling

Observations about work are collected at discrete time intervals, either periodic or random.
Work Sampling Steps

1. Define Operation Tasks
2. Define the task elements
3. Design the study
4. Identify the observers who will do the Sampling
5. Collect Data (as per design)
6. Summarize, analyze and report the results
Observation

- Actual Observation of current practices - GEMBA
- Work load evaluation
- Open dialog with people that perform the job
- Quick results
- Actual utilization of the operators

- Requires continuous maintenance
- Does not lend itself to variety of product mix
PREDETERMINED TIME SYSTEM (PMTS)

Utilizes a Methods-Time Measurement that is used primarily in industrial settings to determine the standard time for completing an elemental task.
PMTS Procedures

- MODAPTS
- MOST
- MTM
MODAPTS

"Modular Arrangement of Predetermined Time Standards"
MOST (Maynard Operation Sequence Technique)

Parameters:
- A = Action Distance
- B = Body Motion
- G = Gain Control
- P = Placement

Categories:
- Reach
- Gain
- Move
- Place
- Return
MOST Procedure

1. Observe job/task
2. Determine sequence(s) to use
3. Determine index values
4. Add index values to determine TMU
5. Multiply TMU by 10
6. Convert TMU to seconds, minutes, hours
MTM (Methods Time Measurement)

MTM Categories
- Reach
- Move
- Turn
- Apply Pressure
- Grasp
- Position
- Release
- Disengage
- Body Motions
- Eye Motions
MTM Tables

Grasp times (TMU) given for five types of grasp. Pick

<table>
<thead>
<tr>
<th>TYPE OF GRASP</th>
<th>CASE</th>
<th>TIME, TMU</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICKUP</td>
<td>1A</td>
<td>2.0</td>
<td>Any size object</td>
</tr>
<tr>
<td></td>
<td>1B</td>
<td>3.5</td>
<td>Object very small</td>
</tr>
<tr>
<td></td>
<td>1C1</td>
<td>7.3</td>
<td>Diameter larger than 1&quot;</td>
</tr>
<tr>
<td></td>
<td>1C2</td>
<td>8.7</td>
<td>Diameter 1/4&quot; to 1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>1C3</td>
<td>10.8</td>
<td>Diameter less than 1/8&quot;</td>
</tr>
<tr>
<td>REGRASP</td>
<td>2</td>
<td>5.6</td>
<td>Change grasp with another hand</td>
</tr>
<tr>
<td>TRANSFER</td>
<td>3</td>
<td>5.6</td>
<td>Control transfer</td>
</tr>
<tr>
<td>SELECT</td>
<td>4A</td>
<td>7.3</td>
<td>Larger than 1&quot; × 1/4&quot; × 1/4&quot;</td>
</tr>
<tr>
<td></td>
<td>4B</td>
<td>9.1</td>
<td>1/4&quot; × 1/4&quot; × 1/4&quot;</td>
</tr>
<tr>
<td></td>
<td>4C</td>
<td>12.9</td>
<td>Smaller than 1/4&quot;</td>
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<td>CONTACT</td>
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<td>Contact, Sliding</td>
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<table>
<thead>
<tr>
<th>DISTANCEMOVED (inches)</th>
<th>TIME (TMU)</th>
<th>WEIGHT ALLOWANCE</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
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<tr>
<td>1/2 or less</td>
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<tr>
<td>2</td>
<td>3.6</td>
<td>4.6</td>
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<tr>
<td>3</td>
<td>4.9</td>
<td>5.7</td>
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<tr>
<td>4</td>
<td>6.1</td>
<td>6.9</td>
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<td>5</td>
<td>7.3</td>
<td>8.0</td>
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<tr>
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<td>8.1</td>
<td>8.9</td>
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<tr>
<td>7</td>
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<td>9.7</td>
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<tr>
<td>8</td>
<td>10.5</td>
<td>11.5</td>
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<tr>
<td>9</td>
<td>11.3</td>
<td>12.2</td>
</tr>
<tr>
<td>10</td>
<td>12.9</td>
<td>13.4</td>
</tr>
<tr>
<td>11</td>
<td>14.4</td>
<td>14.6</td>
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<tr>
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<td>16.0</td>
<td>15.8</td>
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<tr>
<td>13</td>
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<td>17.0</td>
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<tr>
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<tr>
<td>19</td>
<td>27.1</td>
<td>24.3</td>
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</table>

Additional: 0.8 | 0.6 | 0.85 | TMU per inch over 30 inches
PRE-DETERMINED TIME

- Efficient
- Reduced required time
- Method Sensitive
- Objective Approach
- Applicable to Diverse Industries
- Most widely used
- Enables to Develop Standards at planning stage
- Not Sample Size Sensitive
- Detailed Time & Method Study

- Limited to hand, eye and body motions
- Process or machine times may not be established
- Extra allowances are not taken to account
- Not applicable to jobs with a high degree of control
- Not economically feasible for non-repetitive work
PRE-DETERMINED TIME

• Hard to classify some motions
• Difference in opinion between team members
• Variation in distance measurements
• Repeatability and variation of worker
• Very time-consuming to break up job
• Repetitive to enter in data
• May not match actual times
Time Study - Rules

• Don’t comment to the worker during the task

• Stand (don’t sit) beside the worker

• Write every event (even though it may seem not important)- If not caught on camera

• Have a good position to observe/record

• Stop the study if the worker seems to be under pressure and it affects his/her work
Keys to Success

Prepare and Motivate People

Involve Employees

Have information and manage expectations

Success in work Measurement Program
Benefits of Work Measurement

• **Common Currency** for the evaluation and comparison of all types of work.
• Methods Improvement
• Performance Standard provision
• Allows for additional compensation for better performance
• Cost reduction by focusing on productivity improvement & elimination of waste in the process
“For the strength of the Pack is the Wolf, and the strength of the Wolf is the Pack”

“Rudyard Kipling”