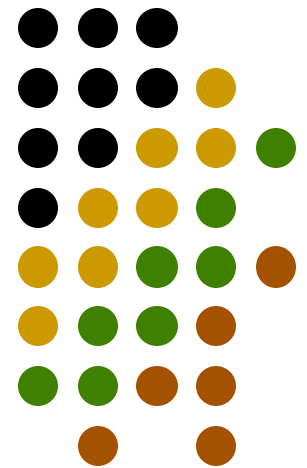


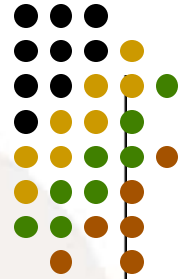
Using Time Studies for Ergonomics



Jose Jose Alvarez
Sandalwood Enterprises Inc.

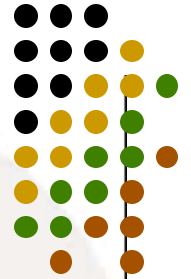


Why should Ergonomists care about Time Studies?



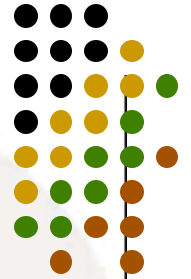
- Gives Ergonomists additional, detailed information about a job
- Helps determine the most efficient and way to accomplish a task
- A tool in your tool belt that will help you understand and work with the process

A Brief History of Time...Studies



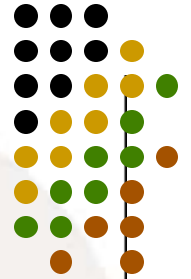
- Frederick W. Taylor
 - Standardizing the task to optimize results
 - “...to develop a science for each element of a man’s work...” *Taylor’s First Principle of Management*
- The Gilbreths (Frank and Lillian)
 - Process Charts, Motion and Micromotion Studies
 - Tried to find the “one best way” to perform a task (i.e. the fastest)
- National Organizations (ASME, AIIE, HFS)

Predetermined Time Systems



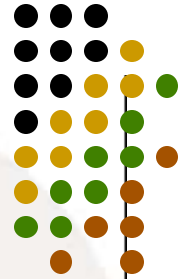
- **Methods-Time Measurement (MTM)**
 - First published in 1948 – Now a family of systems for different applications
 - MTM Association for Standards and Research (<http://www.mtm.org>)
- **Maynard Operation Sequence Technique (MOST)**
 - Developed by H.B. Maynard and Company in 1967-1972
 - H.B. Maynard and Company(<http://www.hbmaynard.com/>)
- **Modular Arrangement of Predetermined Time Standards (MODapts)**
 - Created by AAPT SR (Chris Heyde) in 1966
 - International Modapts Association (<http://www.modapts.org>)

Two Ways to Look at Time Studies



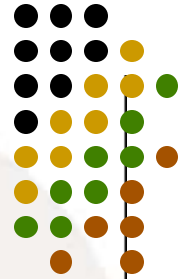
- Proactive (Design or Proposal Stages)
 - Predetermined Time Systems, Simulations
 - Higher costs for analysis
 - Shorter time for each analysis
 - Identifies potential issues earlier in the design process

Two Ways to Look at Time Studies



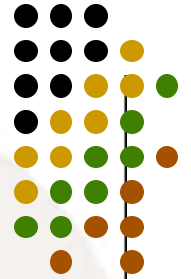
- Reactive (After Implementation)
 - A clipboard and a stop watch
 - Lower costs for analysis
 - More time needed to perform analysis
 - Identifies issues, though may be more difficult and costly to fix issues

Why should Ergonomists care about Time Studies?



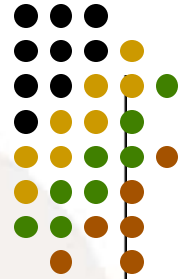
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Gives Ergonomists additional, detailed information about a job



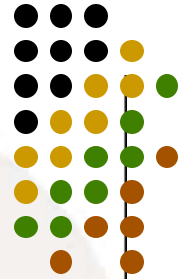
- The data you need for ergonomic analyses:
 - Reach distances, locations
 - Object weight
 - Walking Distances
- Can be collected before or during a Time Study

Why should Ergonomists care about Time Studies?



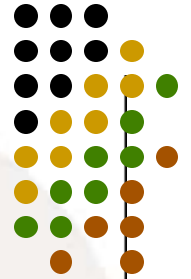
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Helps determine the most efficient and way to accomplish a task



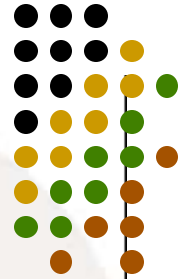
- Run multiple analysis/scenarios
- Identify process elements that are bottlenecks

Why should Ergonomists care about Time Studies?



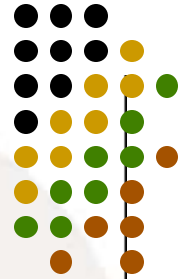
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Less Like a Hammer, More Like a Wrench Set



- Time Studies can give you more flexibility in performing ergonomic analysis
 - Address heavy loads (add personnel/lift assist)
 - Can help measure amount of time operator spends walking (with or without load)
 - Addresses potential awkward postures or reaches
 - Allows you to quickly see the impact of process changes before implementation

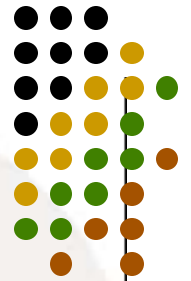
Example 1. NIOSH Lift Equation (1991 Revised)



$$RWL = LC \times HM \times VM \times DM \times FM \times AM$$

- Data for almost all of the components is needed or can be gained through time studies
- This example highlights how to use time studies to gather this information

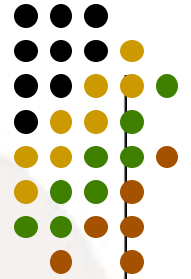
Example 1. NIOSH Lift Equation (1991 Revised)



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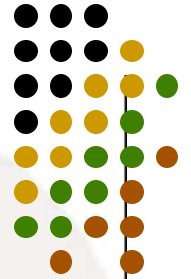
- **FM** – Count number of lifts (and can measure duration of lift)
- **HM & VM** – Reach distances are necessary for proper proactive time studies
- **AM** – Asymmetry (twist) can be considered in PDTS
- **CM** – Part coupling is used in PDTS
- **RWL** – Part weights can be compared to calculated RWL

Example 2. Using time studies to justify a solution

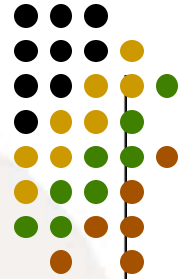


- A Body Shop is changing from 2 shifts to 1 shift. They are also speeding up the production line from 10 jobs/hr to 12.
- A door build station is identified as a possible ergonomic issue for installing the door on the body. Speeding up the line will cause the operator to have a CLI that violates company policy.

Example 2. Using time studies to justify a solution

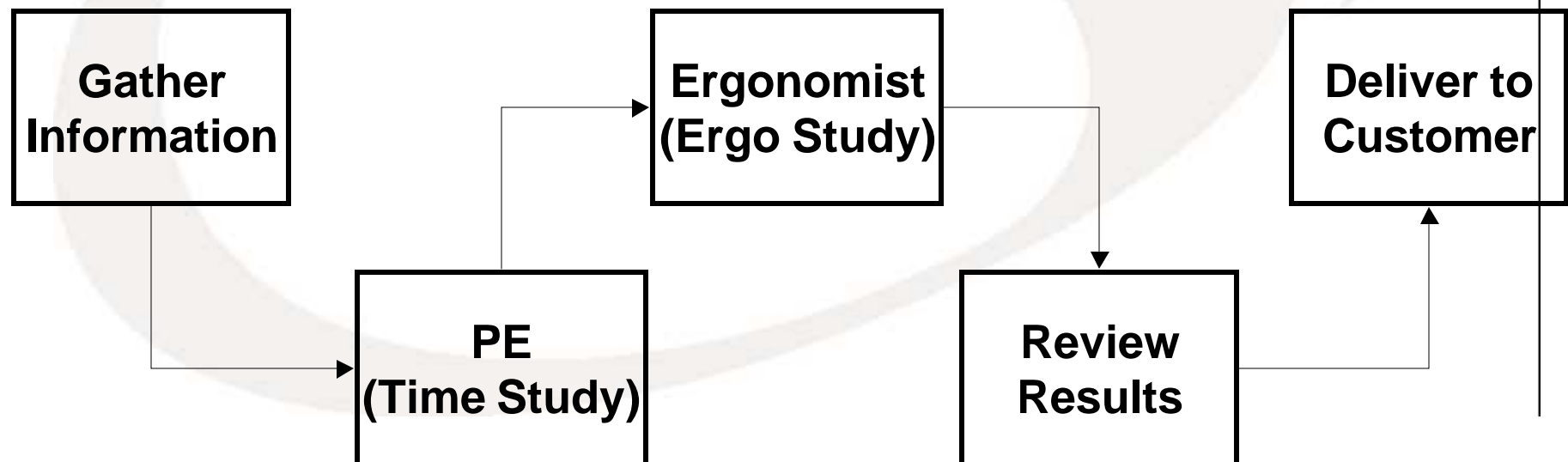


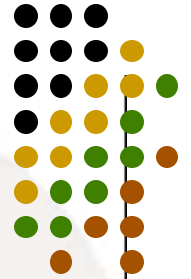
- Time studies can be performed for three different options:
 - Operator using a lift assist
 - A second operator helping with each lift
 - Alternating door lifts with a second operator
- The results of the time study can be used to justify using a second operator or the cost of adding a lift assist to the operation.



Another potential benefit

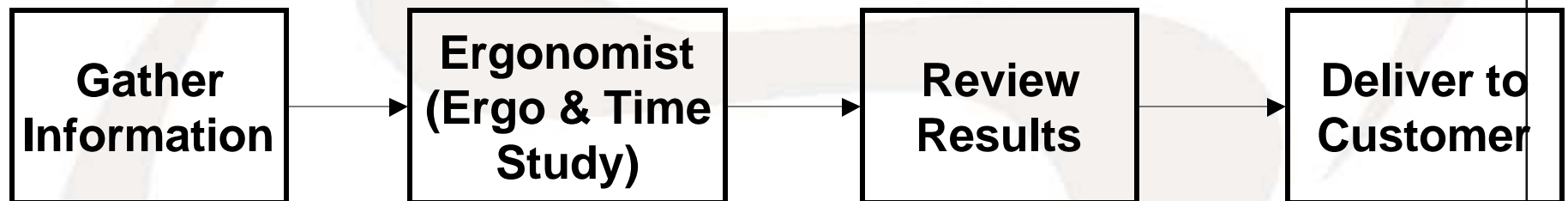
- Having Ergonomists trained in performing time studies can streamline your operations
- Example company's process flow for analyzing a new manufacturing process:





Another potential benefit

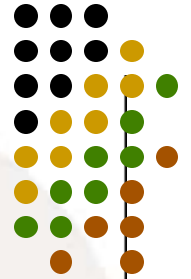
- Once the Ergonomists were trained, the process looked like this:



- Savings
 - Time (Analysis are completed concurrently)
 - Costs (Less personnel/time to complete work)
 - Errors (Less opportunities for miscommunications)

Thanks To...

- Sandalwood Enterprises
- Society for Work Science
- Applied Ergonomics Conference



And Finally...

- Questions?

