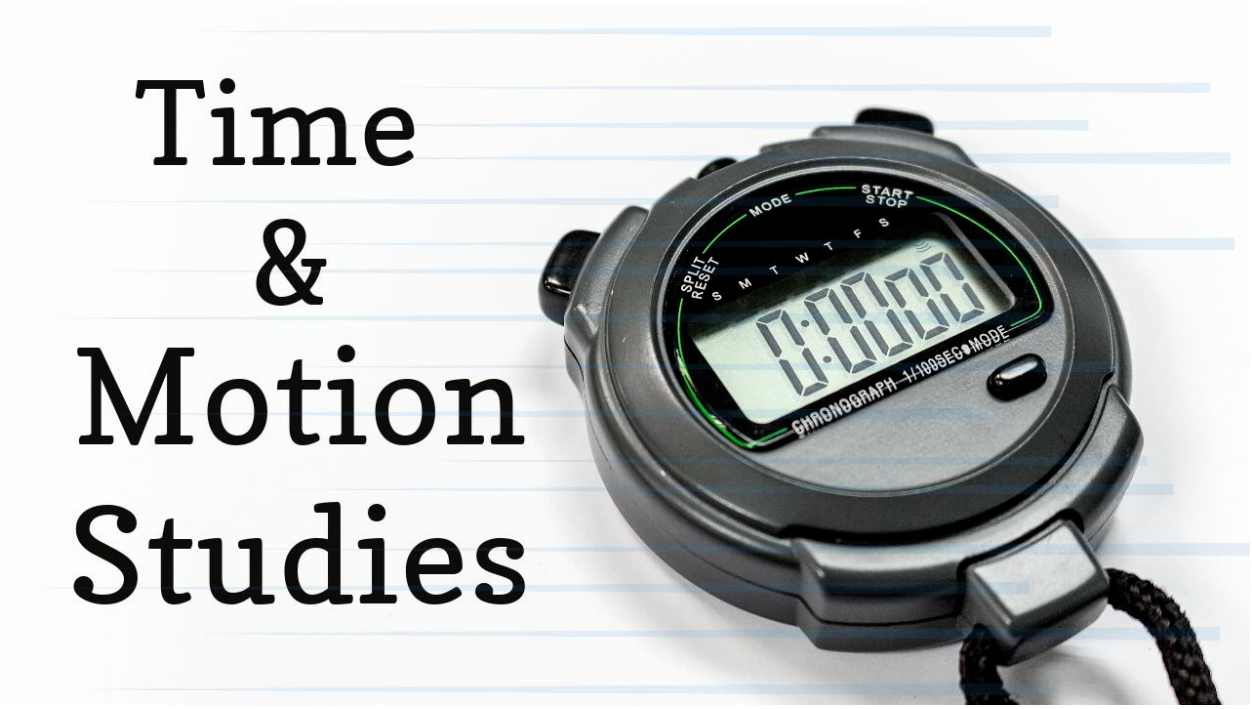
Study Guide: Time and Motion Studies



What is it?

- Time and Motion Studies is how you set the expected operation times in manufacturing or the service industry
- While performing time studies, it is important to be mindful of not interfering with the work of the people being timed
- Time and motion studies are one of the fundamental tools and job tasks of industrial engineers. They're often just called time studies in the industry
- Time and Motion Studies were pioneered by Frederick Winslow Taylor. He's one of the fathers of industrial engineering. He's known for scientific management, which is all about increasing efficiencies and output using measurements
- Frank and Lillian Gilbreth, a married couple, focused on breaking down the motions that people do into very small, distinct parts

- The Gilbreths called these distinct, standard motions therbligs which is their last name backwards.
- Therbligs are used to break down a complex task into its individual components or motions. By doing so, the Gilbreths aimed to identify inefficiencies and optimize work processes. Each Therblig represents a specific action or motion, and they are categorized and analyzed to improve productivity and reduce wasted time and effort.

The primary objectives of Time and Motion Studies are:

- **Efficiency Improvement:** To identify inefficient aspects of a task or process and develop strategies to eliminate or optimize them. This leads to time and resource savings.
- **Workplace Ergonomics:** To ensure that work processes are designed to minimize physical strain on workers, thereby improving safety and reducing the risk of workplace injuries.

- **Standardization:** To establish standardized procedures and best practices that can be consistently followed by workers to maintain a high level of efficiency and quality.

Can you really standardize the motion time it takes to do a task?

Yes, to a certain extent.

The degree to which you can standardize the time for a task depends on several factors:

- **Task Complexity:** Simple, repetitive tasks with minimal variations can be more easily standardized. For example, assembly line processes in manufacturing often involve standardized motions that can be precisely timed.
- **Worker Skill and Experience:** The skill and experience of the worker performing the task can impact the time it takes. Highly skilled workers may perform tasks faster and more efficiently than those with less experience.
- **Tools and Equipment:** The type and condition of tools and equipment used in a task can affect the time required. Well-maintained, modern equipment may enhance efficiency, while outdated or malfunctioning tools can slow down the process.
- **Environmental Factors:** Factors like workplace layout, lighting, temperature, and noise can influence the time it takes to complete a task. These variables are often beyond the worker's control and can introduce variability.
- **Human Variability:** Every individual has unique physical attributes, energy levels, and work habits that can affect task times. This human variability can be challenging to standardize fully.
- **Adaptation and Learning:** Workers may adapt and improve their techniques over time, leading to changes in task times.

Additionally, new workers may require an adjustment period to reach the established standard.
- **Task Variability:** Some tasks may inherently involve a degree of variability due to unpredictable elements, such as customer interactions in service industries.

Given these challenges, complete standardization of motion time for all tasks is often impractical. However, the goal of time and motion studies is not always to achieve absolute standardization but rather to:

- Identify best practices and establish standardized procedures that minimize variations in task time.
- Continuously improve efficiency and reduce unnecessary movements or time-wasting steps.
- Set reasonable performance standards that can be consistently met by most workers.
- Provide a baseline for measuring performance and identifying areas for improvement.

In practice, time and motion studies aim to strike a balance between standardization and adaptability, recognizing that some level of variability may persist due to the factors mentioned above. The goal is to optimize processes to achieve greater consistency and efficiency while allowing for necessary adjustments and improvements over time.

How to Perform Time and Motion Studies?

Process	Current Time	Standard Time
Filling (min)	3.71	3.25
Packaging(min)	2.56	2.0
Setting (min)	4.98	4.5
Total Time Cycle Complete (hr)	3.39	3.21

- First of all, you have to make sure you have a clear physical set point that triggers each and every element. An element is just typically what we call a step in the industry, so your operation is made up of many steps, it's made up of many elements.
- A lot of times grab or touches are perfect trigger points. As soon as you see something touch something else, start your timer.
- The last step leads back into the trigger point of your first step and that would constitute a full cycle.
- It is important to note that the people you are timing are not going slow on purpose. You can enlist the help of someone familiar with the process to make sure the speed of work is reasonable.
- To recap so far, you need to write down the trigger points in the process, the elements of each step in the cycle, and when you get to the very last trigger point in your cycle, you stop the stopwatch.

- You do this process about 5 to 10 times in a row, then sum up all your time for each element and divide it by the number of observations to get an average.
- Once you get the average time for each element, you will have a better idea of how long it takes to do the entire cycle.
- Use decimal minute watches for time studies. That's just because most decimal minute watches go out to the third decimal, and minutes as opposed to seconds, that's just a lot easier for calculations, and it's a lot more accurate at the time.
- Make sure the people that are going to participate in the time study understand what is happening and the benefits of time studies so they feel at ease during the process.