



## **PDSA Circle**

Ed Tilden, TQL Associates

### **"BACKGROUND:**

PDSA refers to the process of continual improvement and learning proposed by Walter Shewhart and espoused by W. Edwards Deming. The letters stand for Plan, Do, Study, and Act. Dr. Deming introduced Dr. Shewhart's 'Cycle' to the Japanese in 1950, and the Japanese English translation became Plan, Do, Check, Action which was changed to Plan, Do, Check, Act in the United States for reasons of grammar. Dr. Deming, upon hearing this translation of what he had taught the Japanese, said that the definition of 'check' was 'to hold back,' which was not what he had intended the step to be. He suggested several terms, but 'study' seemed to stick. The PDSA Cycle is also referred to as the "Deming Cycle" in honor to the man who introduced it to so many people in government, business and education.

### **DEFINITION - BASIC PDSA:**

**PLAN** - Plan ahead for any change. Analyze the current situation and potential impacts of the change before doing anything. This is the important process of "prediction" and postulating a theory. Think ahead about what to measure to determine if you are achieving your purpose and plan to include measurements as part of the execution. Do not leave thinking about what to measure until a later stage. Develop an implementation plan, and staff it fully with all process owners. Ask the following questions ("The Five Ws and an H"):

1. WHO does this plan impact (specifically, with what presumed or required characteristics or qualifications)?
2. WHAT is the purpose of the interface/relationship? WHAT are we trying to accomplish? WHAT change can we make that will result in improvement? (Whichever question is appropriate).
3. WHY does this support the end purpose of the system (i.e. 'vision')?
4. WHERE will this take place (addressing all characteristics of the intended location from parking to power to how many inches from the wall, etc.)?
5. WHEN is it to occur (i.e. earliest start/end, latest start/end, sequence/timing of steps/sub-processes)?
6. HOW - a step by step procedure to convert any and all system/process inputs to all system outputs. HOW will we know that the change is an improvement

**DO** - Try the change on a small scale under controlled circumstances (i.e. experiment or prototype first).

**STUDY** - Analyze the results of your experiment. What do the data tell you about the effectiveness of the test?

**ACT** - Take action to STANDARDIZE the process that produced the results you desired. This is where we 'mistake-proof' the process to limit special cause variation.

### **DEFINITION - NESTED PDSA:**

Also referred to as "wheel-within-a-wheel," the nested PDSA process involves doing PDSA as part of each PDSA step. In other words, within the Plan step we have PDSA - the need to Plan the Plan, Do the Plan, Study the Plan, and Act on the Plan. Each PDSA step would have a PDSA process "nested" within.

Another analogy is a "wheel-within-a-wheel." This makes the PDSA Cycle a three-dimensional process. The Five Ws and an H should also be asked at each step in the nested PDSA cycle.

The Deming Cycle is typically depicted as a circle with PLAN at the 12 O'clock or North position, DO at the 3 O'clock or East position, STUDY at the 6 O'clock or South position, and ACT at the 9 O'clock or West position. It may also be depicted as a circle divided into quadrants - PLAN upper right, DO lower right, STUDY lower left, and ACT upper left. The process steps proceed clockwise in order. The Nested PDSA cycle can be considered as four separate mini-PDSA Cycles associated with each of the basic PDSA steps. One may



visualize mini-PDSA Cycles inside or outside of the larger cycle adjacent to each step (two-dimensional), or above each step of the larger cycle (three-dimensional).

The starting point of PDSA depends on where you are in the improvement process. If a process already exists then you would probably start incremental improvement at the STUDY step where you observe the need for further change (SAPD). Breakthrough improvement might start at the ACT step where some unexpected event acts on the process and causes us to plan for either eliminating the event if undesirable or institutionalizing the event if desirable (APDS). In fact, where you start in the cycle is not as important as the cycle itself. Nevertheless, the Planning step is undoubtedly the most important step. Regardless of where you start the process remember that "Proper prior planning prevents particularly poor performance" (P to the 7th power).

The PDSA Cycle repeats itself continuously - there is no ending point - and thus is the basis of true 'Continuous Improvement.' This repetition is experienced in both the basic cycle as well as the nested, or "wheel-within-a-wheel" cycle.

**EXAMPLE:**

An example of the PDSA Cycle that many people can relate to would be that of a person doing target practice with a gun or bow:

1. Plan - Ready/Aim
2. Do - Fire
3. Study - Count the holes and analyze their positioning on the target
4. Act - Adjust your sights

An expert marksman is continuously improving the process. An expert marksman who is also adept at the Deming Cycle would also be working on improving each step of the PDSA Cycle (i.e. Study the holes in the target with the use of a telescope along with wind, humidity and barometric pressure measurements).