



## STANDARD OPERATING PROCEDURES: MANAGING THE HUMAN VARIABLES

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### **Introduction**

We can spend thousands or even millions of dollars building a milking parlor and milking equipment system that will perform every day exactly as we want. We can adjust the take-off settings, the pulsation rate, and the vacuum level. We can have an information system that gathers important data about every cow that is milked so that we can respond to any changes in her performance appropriately. We can buy or harvest high quality forages that have little variation in moisture or composition. We can control our fans, sprinklers, and curtains to help ensure that cows are comfortable.

But if we can't employ a workforce that operates the parlor consistently, then the whole operation will fail. Full adoption of the standard operating procedure (SOP) process can go a long way toward ensuring that the necessary workforce is in place. The full SOP process includes planning, developing, implementing, and monitoring. This paper will demonstrate the need for SOPs and how they can be a big part of managing human resources.

### Variation in Processes

Standard operating procedures are a means to remove variation in work performance caused by people completing the same work processes in different ways. A process is a set of actions that a person or group of people must perform in order to complete a job. A standard operating procedure describes the steps that people should use to complete the process. Thus, on a dairy farm, prepping and attaching milking units to cows is a process. Dry treating a cow is a process. Setting up and washing the milking equipment system is still another process.

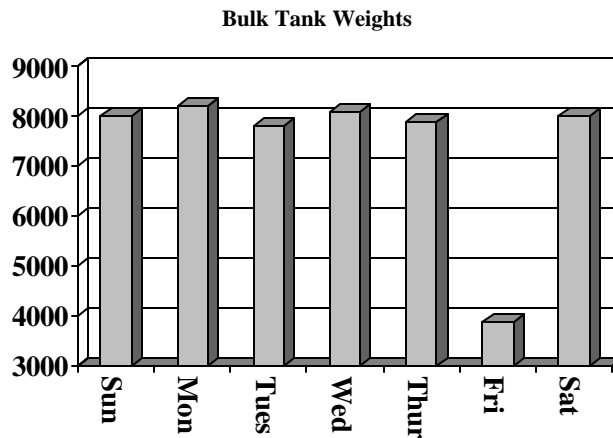
Variation in processes can lead to reduced milk production, poor milk quality, increased incidence of mastitis, antibiotic contamination of milk, high bacteria counts, and any other problem that you can name. But since some variation is normal, how can it have such an impact on performance? The answer is that there are two types of variation.

The famous management educator W. Edwards Deming defined *common cause variation* as the result of the myriad imperceptible changes that occur in the everyday operation of a process. Fluctuation in daily dry matter intake by only a pound or two is likely due to common cause variation. Likewise, minor fluctuation in bulk tank bacteria counts is due to common cause, unmanageable variation.

On the other hand, significant variation that has a definite cause is known as *special cause variation*. Special cause variation is caused by something that can be identified and controlled, such as human performance.

For example, in the graph below we see bulk tank weights tracked every day for a week in a 100-cow herd that is averaging about 80 pounds per cow. On most days, the tank weight is quite consistent. On Friday, the AM milking had to be dumped because someone milked a cow treated with antibiotics into the bulk tank. The slight variation on most days is generated by common causes such as weather and natural variation by the cow. The Friday variation was generated by a special cause known as human error.

Figure 1: Variation example



As we noted before, standard operating procedures are a means to remove variation in work performance caused by people completing the same work processes in different ways. Standardizing the work processes and ensuring that people enthusiastically follow them will virtually eliminate errors such as the contaminated milk in the example above.

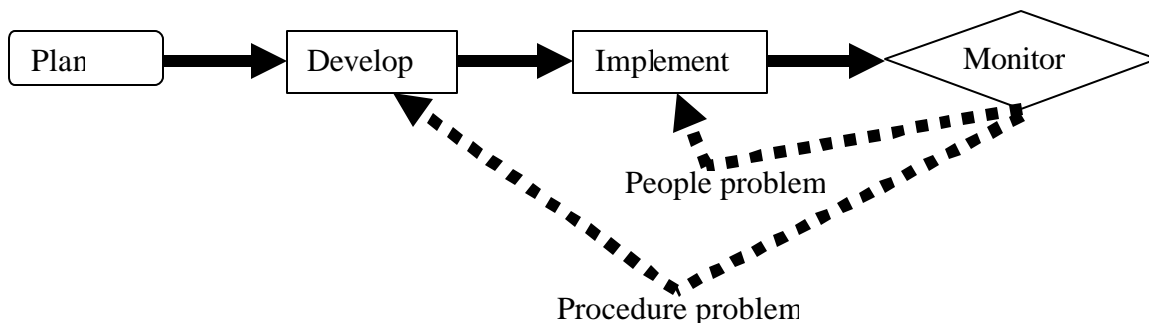
Danish researchers published an important study of variation in milking procedures that illustrates the need to control special cause variation. The research compared cows milked with a standardized routine to cows that were milked with a traditional, tie-stall routine. In the traditional routine, the lag time from cow preparation to milking unit attachment was quite variable, while the prep and timing were very consistent in the standardized routine. The results indicated that the cows milked with the standardized routine yielded about 10.7% more milk over the course of a lactation (Rasmussen, 1990).

Special cause variation doesn't have to be as dramatic as dumping a tank of milk, it can be as simple as the milker who doesn't get teat ends clean. Every time that person fails to properly clean the cow, and thus exposes her to mastitis-causing organisms, an incident of harmful variation occurs.

## The SOP Process and Human Resource Management

Most people think of a standard operating procedure as a piece of paper that contains step-by-step directions about how to complete a job. That image is correct...in part. However, in order to get the full benefit of managing with SOPs, one needs to think in terms of an SOP process. The SOP process includes planning for results, development, implementation, monitoring, and performance feedback; all of which are proven elements of effective human resource management.

Figure 2: The SOP Process



A good SOP process is about engaging the creative talents of managers, workers, and advisors in a cooperative way. When this is done well, the result is an outstanding procedure that everyone feels committed to. Attempting to create SOPs at the management or advisor level and then simply imposing them on workers is an exercise in futility. Imposing SOPs on others without their input leads to resentment, rejection of the SOP, and countless small acts of sabotage that defeat the purpose altogether.

The right way to design SOPs is in a participative manner. Participative management means encouraging everyone that will be affected by the SOP (the stakeholders) to contribute to its development. Leading this process takes practice, but it is worth the effort because teams of people will always outperform individuals.

Leadership for SOP development should come from the manager of the process to be standardized. He or she may work closely with an outside advisor with technical expertise in the process such as a veterinarian or nutrition consultant. Often, this team leadership approach is effective because the two can complement each other's strengths and weaknesses.

The SOP development leaders should be aware of five obstacles to participative management (Silos, 1999).

1. Resistance to change. Working together to create great procedures is a radical change for some dairy organizations. Leaders need to make sure that everyone knows what is happening and why.
2. Mistrust by workers of management's motives. Workers are used to just working, not contributing to improvement. It is critical for the leader to create an atmosphere that

values and respects the contributions of all stakeholders. At times it may be necessary to bring in an outside facilitator to ensure that everyone provides some input and to keep the process on track.

3. Lack of clear expectations. Workers may not be sure how much to contribute or what is appropriate. Reassure them that they won't get into trouble for bringing up their ideas.
4. Lack of participative skills. Managers, employees, and advisors all struggle with this at times. Make the opportunity for input as non-threatening as possible. Once again, sometimes an outside facilitator may be necessary.
5. Lack of commitment from top management. Without commitment from the top to support participation, there is no chance for an SOP process to succeed.

### **Plan For Results**

Just like other management activities, advance planning greatly increases the chance of success with standard operating procedures. The person or small team that will lead the SOP development process needs to make plans and decisions before the development process can begin with the other stakeholders. Decisions that should be made in the planning stage include the following:

1. What business goals will the SOP help to achieve? Clearly define the process and products that will improve when the SOP is in place. Illustrate for everyone why the process is important and how it contributes to individual and business success. For example, the goal of a milking SOP is to quickly and efficiently harvest high-quality milk and eliminate the spread of mastitis organisms. Standard operating procedures work best when they are designed to achieve specific results.
2. How will we monitor performance so that we know workers are following the SOP and so that we have information to feed back to the workers? SOPs are about reducing variation introduced by people. We must be sure that everyone understands the procedure and follows it.
3. How will we monitor results to know if the SOP itself is properly designed to be effective? The old saying, "If you can't measure it, you can't manage it," definitely applies here. Think about what you will measure. For example, in the milking parlor, you might measure the pounds of milk harvested per milker per hour and the rate of new mastitis infections per month. These indicators would show how efficiently cows are milked and how effective the procedures are at preventing the spread of mastitis.
4. What type of procedure format should I use? There are a lot of ways to present an SOP. We can't go into detail about the many different formats in this article. (For more information see Stup, 2001)
5. How can I get everyone (management, workers, and advisors) to buy into this SOP? If you can't get everyone on board, it won't work.

### **Development**

Once the leadership has answered the five questions in the planning stage, it is time to move on to development. It is in the development stage that the procedure is opened up for input and review from the stakeholders: workers, other managers, and other advisors. Everyone whose

work is in some way affected by the SOP should have an opportunity to make suggestions to improve the process.

Development is an extremely important stage, because it is here that people must begin to feel ownership in the SOP. Stakeholders, particularly the workers, will feel ownership and commitment to an SOP only if they believe that their ideas were included during development. Workers will not feel committed to the SOP if they believe that management is imposing it without regard for their input. Another excellent reason to involve the workers is that they are likely to have good ideas. Only the frontline workers know the day-to-day challenges and opportunities that will come to bear on actual SOP performance.

Share with the stakeholders the business goal that the SOP will improve. Give the stakeholders an opportunity to suggest changes or additions to the goal. Goals should lead directly to the measurements that will be included in the monitoring step. For example, a goal statement for the milking procedure might include specific plans for milk quality, milk production, parlor throughput, etc.

In most cases, the leaders should provide a rough first draft of the procedure for everyone to review. It's very important to let everyone know that the document is only a draft at this point. A draft means that it is wide open to changes of any kind. Many people view a document written on paper as if it were already a final version, especially if it is typed. If people feel this way, then they will not feel free to offer their input, and the SOP will not receive everyone's important contributions.

The SOP may pass through several revisions while in the development stage. By the time a final version of the procedure is drafted, everyone involved should have had an impact on its final form. When there is disagreement about how a step should be performed, there should be a clear reason why the alternative finally chosen was selected. In addition, the leader must get agreement from those that argued for the losing alternative to follow the procedure faithfully.

One of the last steps in the development stage is to test the SOP. It seems simple, but sometimes written procedures cannot be completed as written. The ultimate test is to ask someone unfamiliar with the procedure to follow the SOP exactly as it is written. If they can't complete the procedure using the SOP reasonably well, then it should be revised.

## **Implementation**

After a satisfactory standard operating procedure is developed and tested, it is time for implementation. The SOP leader needs to make sure that everyone receives a copy of the SOP to study and review. In addition, the SOP should be posted, if possible, in the workplace where it will be completed.

The next step in implementing the SOP is often the most neglected. Train or retrain everyone as necessary to follow the procedure exactly. Even with very detailed steps, it is necessary to train all workers. Otherwise, individuals will interpret the meaning of some steps in different ways, leading to harmful variation in processes and results.

When training workers, share the reasons *why* procedures must be performed correctly—not just what to do or how to do it. People are much more likely to follow procedures exactly when they understand why they are important. In addition, sharing *why* demonstrates that you care about the worker and his or her success. It also helps develop the worker's job knowledge and enhances his or her ability to contribute to future process improvements. Once the procedure is implemented, the next step is to put in place the monitoring program.

### Monitoring and Feedback

Monitoring stems from the performance goals that leadership established in the planning stage. An effective monitoring system really must measure two different things:

1. Are *all* the workers *consistently* following the SOP, and
2. Is the SOP designed correctly to achieve the desired results?

These questions need to be addressed in the order shown, because we really cannot evaluate whether the SOP is correct without knowing that everyone is following the SOP faithfully. If we discover through monitoring that people are not following the SOP exactly, then we need to revert to the implementation stage to train or re-train the workers. If we find that the SOP is not designed correctly, then we need to move to the development stage and make changes to the SOP (see Figure 2).

Let's consider an example. We established earlier that the goal of a milking SOP could be to quickly and efficiently harvest high-quality milk and eliminate the spread of mastitis organisms. Following is a simple step-by-step procedure for prepping and attaching milking units:

Figure 3: A basic SOP

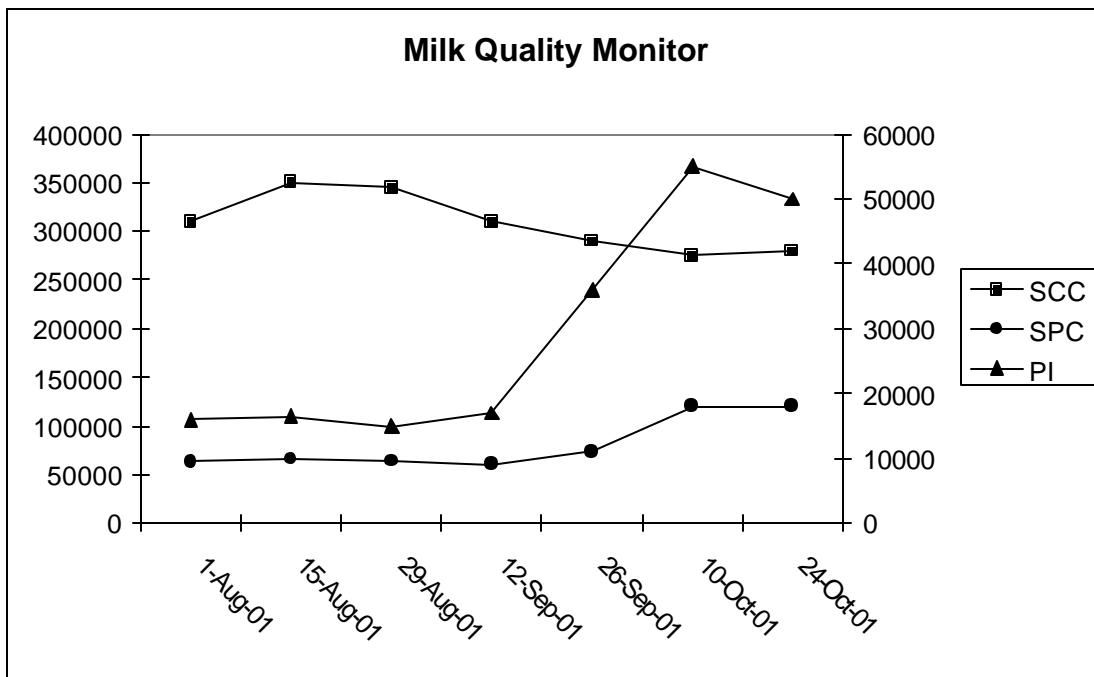
Milking Preparation & Attachment
<ol style="list-style-type: none"> <li>1. Wipe dirt and debris from the first cow's udder.</li> <li>2. Pre-dip all 4 teats with the green dip cup.</li> <li>3. Strip 2 squirts of milk from each teat and observe for abnormal milk.</li> <li>4. Repeat steps 1,2,and 3 with the second and third cows on the same side.</li> <li>5. Return to the first cow and thoroughly wipe with a clean towel. Make sure that teat ends are clean.</li> <li>6. Attach unit to the first cow and adjust.</li> </ol>

In order to monitor this process we need to first make sure that everyone is following the SOP exactly as it is written. A supervisor can observe each step in the milking SOP above. He or she can assess performance on Step 5 by wiping teat ends with a cotton swab after the milker completes Step 5 and before he completes Step 6. The supervisor should immediately share his performance assessment with the worker. He or she should offer abundant praise for the steps that were well done in addition to correction and coaching for the steps that need improvement. The supervisor should always seek to reinforce *why* key steps must be performed in exact accordance to the SOP and what consequences will result when procedures aren't followed.

For many procedures there is no substitute for direct observation by a supervisor. The milking procedure is one such example. Supervisors need to be present on a regular and frequent basis so that milkers are accustomed to seeing him. If the supervisor's visit is an unusual occurrence, then people are likely to change their work habits when he is present.

Once we are certain that all milkers are following the milking procedures, we can confidently monitor the results to determine if the procedure is correctly designed. Because we know that workers are following the procedures, any performance problems that emerge must be the result of shortcomings in the SOP. Information such as somatic cell counts, standard plate counts, and preliminary incubation counts indicate how well the SOPs are working to achieve the business goals. This information should be tracked and posted for all workers to see. A chart such as the one shown below will help motivate all stakeholders to do their part to keep the performance indicators moving toward the goals.

Figure 4: Example feedback chart



Many modern parlors are equipped with computerized information systems that can generate a great deal of information about how cows are milking out. Measures such as peak milk flow, number of reattaches, milk yield, throughput, and milking duration can yield valuable information about both individual milker performance and the SOP itself (Eicker, 2000).

Procedures in the milking center tend to become dull and repetitious. This situation is aggravated when workers do not receive information about how well they and the systems they operate are performing. Monitoring provides information that managers can use as performance feedback to help energize, direct, and motivate workers. This feedback, combined with clear performance goals and a participative management style can dramatically improve worker motivation.

## **Conclusions**

No quick fix is possible to remove variation introduced when different people complete a process. A thorough standard operating procedure program can remove much of the variation by bringing workers, advisors, and management together to design the best possible procedure.

Perhaps the best benefit of the participative SOP process is that many challenges can be solved at once. A participative style makes managers better, it leads to happier and more motivated workers, and it creates procedures that are far more effective than when management designs them alone.

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