



Western Dairy News

April 2004
Volume 4, No. 2

for the West, about the West, from the West

Making decisions regarding the balance between milk quality, udder health, and parlor throughput (part 1)

By Matthew J. VanBaale, Extension Specialist, Dairy, University of Arizona
John F. Smith, Extension Specialist, Dairy Kansas State University
Dennis V. Armstrong, Extension Specialist Emeritus, Dairy, University of Arizona
Joseph P. Harner III, Biological and Agricultural Engineering, Kansas State University

As today's dairy industry consolidates, cows are being milked more rapidly through larger milking parlors on larger dairies than ever before. Because milk is the primary commodity and source of income for producers, the harvesting of milk is the single most important job on any dairy.

Producing high-quality milk to maximize yields and economic value requires effective parlor management, an enormous challenge for pro-

ducers. Managing large parlors includes managing labor, milking equipment, as well as monitoring and evaluating parlor performance.

Table 1. Time (seconds) required for individual events of the milking procedure.

event	procedure		
	minimal*	full	full + 10 sec. contact
strip	4-6	4-6	10
pre-dip	0	6-8	6-8
wipe	6-8	6-8	6-8
attach	8-10	8-10	8-10
total	12-18 sec.	24-32 sec.	30-36 sec.

*Strip or wipe and attach

ducers. Managing large parlors includes managing labor, milking equipment, as well as monitoring and evaluating parlor performance.

Decisions concerning the milking center are some of the most complicated decisions a dairy producer has to make. Milking procedures, herd size, milking interval and the equity position of a producer influence these decisions. Producers will

have to make the following decisions before they can select or develop management protocols for a milking parlor:

1. How many cows will be milked through the parlor?
2. What milking procedure will be used (minimal or full)?
3. If a full milking routine; how much contact time do you want (strips per teat)?
4. Which milking routine will be used (sequential, grouping, or territorial)?
5. Are you willing to train teams of milkers to operate large parallel or herringbone parlors?

This two-part paper reviews factors to consider when developing, selecting, and implementing a milking procedure and/or routine. Part one will focus on milking procedures in different types of parlors. Next month in part two labor training and management issues as well as parlor performance monitoring will be discussed.

Options for milking procedures and routines in parallel and herringbone parlors

The two predominant milking procedures are minimal (strip or wipe and attach) and full (pre-dip, strip, wipe and attach). Milking procedures impact the

number of cows per stall per hour in parallel, herringbone and rotary parlors. In large parallel and herringbone parlors cows per stall per hour were 5.2 when minimal milking procedures were used and 4.4 when full procedures were used. Cows per stall per hour declined from 5.8 to 5.3 when a minimal routine was used compared to a full routine in rotary parlors (Armstrong et al. 2001).

Table 2: Advantages and disadvantages of a minimal milking routine.

- Compromises teat skin sanitation.
- Successful when cows enter the milking parlor clean and dry.
- Machine on-time may be prolonged.
- Steady state throughput is increased.
- Time required to milk the herd may be decreased (total milking time).
- May require milkers to decide when extra cleaning of dirty teats is required.
- Can cause lower milk quality and higher mastitis when compared to full hygiene.

Table 3: Advantages and disadvantages of a full milking routine.

- Maximizes teat sanitation and milk letdown.
- Use 4 separate procedures or can combine into two or three procedures.
- Use when maximum milk quality results are the goal.
- Minimizes machine on-time.
- Results in lower cow throughput or higher labor cost compared to "minimal or none."
- Requires milker training to maximize results.

In large parlors milking procedures have a dramatic impact on the number of units one operator can handle in parallel and herringbone parlors. In 1997, Smith et al. published guidelines for the number of units that one operator could handle using a minimal and a full milking procedure. When a full milking procedure was used a milker could operate 10 units per side and 17 units per side when using minimal milking procedures. These recommendations were based on allowing 4-6 seconds to strip a cow and attaching all the

(continued on next page)

Western Dairy News is a collaborative effort of Dairy Specialists from:



Knowledge to Go Places



Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

OREGON STATE UNIVERSITY



Production effort for Western Dairy News



Animal Health

is generously sponsored by Pfizer Animal Health

units on one side of the parlor within 4 minutes.

In recent years several milking management specialists have been recommending 2-3 squirts per teat (8-10 seconds) when stripping cows to increase stimulation and promote better milk letdown. Some of these management specialists believe that increasing the amount of stimulation reduces unit on times. At this time a strong data set supporting this theory does not exist.

An AABP research update reported by Rapnicki, Stewart, and Johnson (2002) indicated that milk flow rate decreased when cows that had been previously stripped were no longer stripped. If this is implemented, producers will have to reduce the number of units one operator can manage per side (Table 1). The sequencing of the individual events of the milking procedure is critical. Rasmussen et al. (1992) reported an ideal prep-lag time of 1 minute and 18 seconds. Prep-lag times of 1-1.5 minutes are generally accepted as optimal for all stages of lactation. Some of the advantages and disadvantages of minimal and full milking procedures are listed in Tables 2 and 3.

Three predominant milking routines are used in parallel and herringbone parlors (sequential,

Figure 1 – Sequential milking routines for double-20 parallel parlors using minimal and full milking procedures.

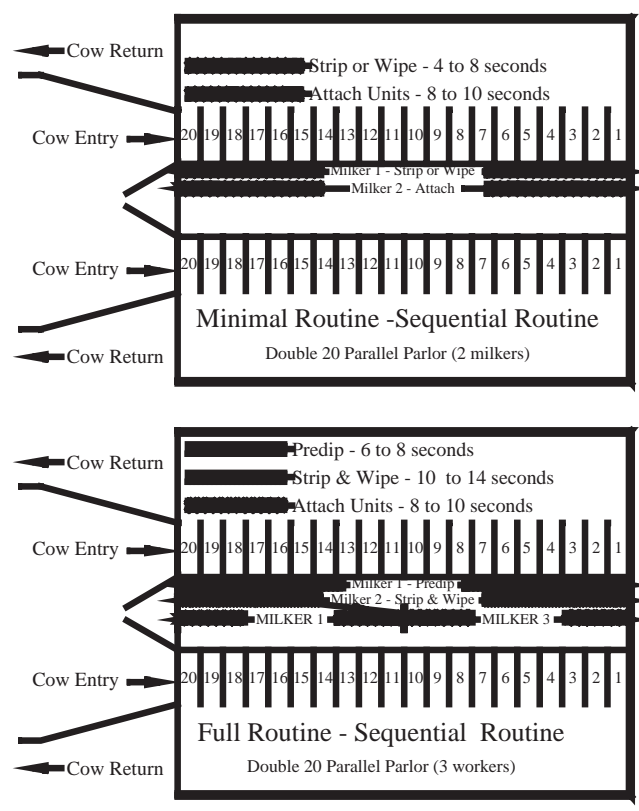


Figure 2 – Different milking routines for parallel and herringbone parlors.

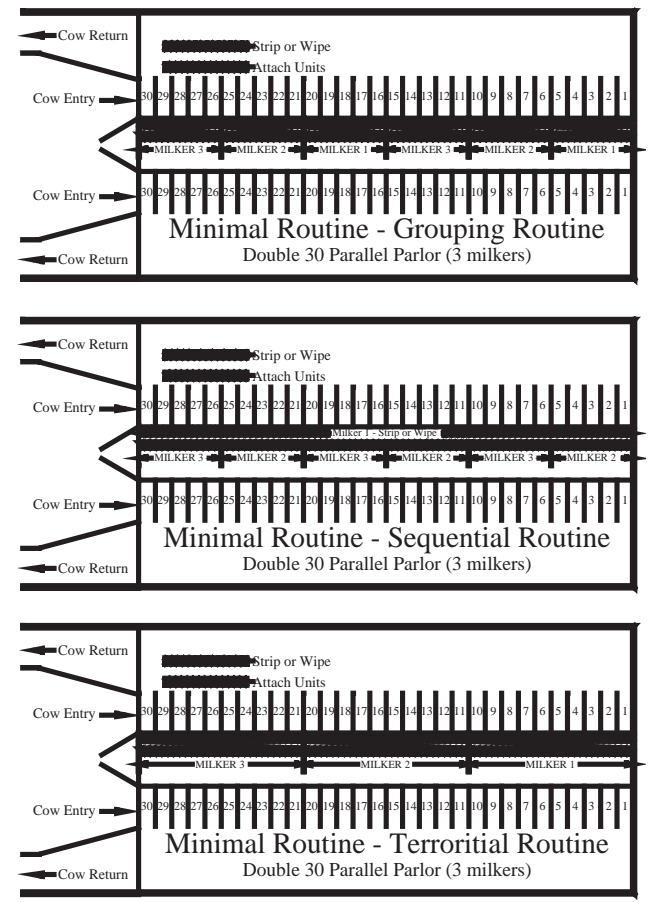
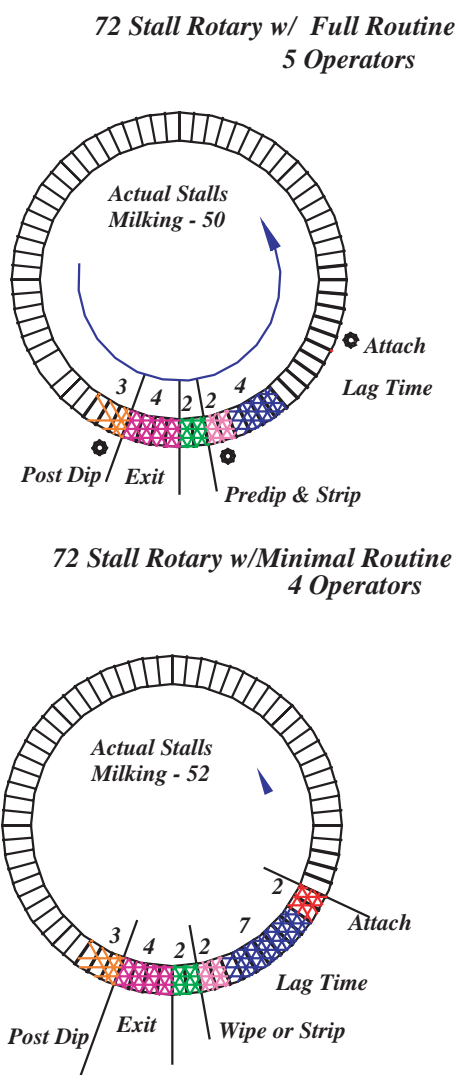


Figure 1 – Different milking routines for parallel and herringbone parlors.



grouping, and territorial). These milking routines are presented in Figure 2. The use of territorial routines will reduce throughput 20-30% when compared to sequential routines (Smith et al. 1997). Grouping routines seem to be an alternative to sequential routines without sacrificing throughput. Sequential and grouping rou-

tures are demonstrated in Figure . Both full and minimal milking procedures in rotary parlors are presented in Figure 3.

Although it is difficult to determine the “Best” procedure and routine for every dairy, it is possibly more difficult to get employees to understand and follow the recommendations of management.

References

- Armstrong, D.V., M.J. Gamroth, and J.F. Smith. 2001. *Milking Parlor Performance. Proc. of the 5th Western Dairy Management Conference*, pp 7-12. Las Vegas, NV.
- Rasmussen, M.D., E.S. Frimmer, D.M. Galton and L.G. Peterson. 1992. *Influence of premilking teat preparation and attachment delay on milk yield and milking performance. J. Dairy Sci. 75:2131.*
- Smith, J.F., D.V. Armstrong, and M.J. Gamroth. 1997. *Labor Management Considerations in Selecting Milking Parlor Type & Size. Proc. of the Western Dairy Management Conference*, pp. 43-49. Las Vegas, NV.
- Stewart, S., S. Godden, P. Rapnicki, D. Reid, A. Johnson, and S. Eicker. 2002. *Effects of Automatic Cluster Remove Settings on Average Milking Duration, Milk Flow, and Milk Yield. J. Dairy Sci. 85:818-823.*

Common milking parlor terms:

- Prep time** – Time taken to manually clean and dry the teat surface.
- Contact time** – The actual time spent manipulating/touching teats and is the source of stimulation for oxytocin release.
- Prep-lag time** – time between the beginning of teat preparation to the application of the milking machine.
- Milking procedures** – the individual events (i.e. strip, pre-dip, wipe, attach) required to milk a single cow.
- Milking routines** – define how an individual milker or a group of milkers carry out a given milking procedure (minimal or full) over multiple cows. In parallel and herringbone parlors; there are three predominant milking routines (grouping, sequential, and territorial).
- Grouping milking routine** – In a grouping routine the operator performs all individual tasks of the milking procedure on 4-5 cows. Once they have completed a group of cows they move to the next group of available cows.
- Sequential milking routine** – Operators using a sequential routine split up the individual tasks of the milking procedure between operators and work as a team. Operators work as a team following each other performing their individual tasks.
- Territorial milking routine** – Milkers are assigned units on both sides of the parlor and only operate the units assigned to them. When a territorial routine is used milkers are not dependent on other milkers to perform specific tasks.

Western Dairy News is published as a service to people interested in the health and welfare of the Western dairy industry. Archives of this publication may be found at:

<http://animalscience-extension.tamu.edu/dairy/wdn.html>

For further information contact:

Dr. Ragan Adams, Editor
ILM, CSU-VTH
300 W. Drake Road
Fort Collins, CO 80523
970-297-0371
radams@lamar.colostate.edu

Material published in Western Dairy News is not subject to copyright. Permission is therefore granted to reproduce articles, although acknowledgement of the source is requested.

Cooperative Extension programs are available to all without discrimination.