Retrofit Parlors – Case Studies

David W. Kammel
Professor
Biological Systems Engineering
UW-Madison

Vance Haugen
Associate Professor
Agriculture Agent
Crawford County

Jim Leverich
Professor
Agricultural Agent
Monroe County

Mark Mayer
Associate Professor
Dairy/Livestock Agent
Green County

Tim Rehbein
Associate Professor
Agriculture Agent
Vernon County

Introduction

The transition from a tie stall barn housing and milking system to a free stall housing and parlor milking system is occurring throughout the country for all sizes of dairy farms. In many cases the amount of money available to spend is limited. Retrofitting the existing tie stall or stanchion barn into the milking center is one option often considered by the dairy farm to keep costs down. In addition, many farms feel more comfortable making the transition into a freestall/parlor system in small steps by retrofitting existing facilities for new uses.

It is especially important in retrofitting a parlor to consider carefully any decisions affecting the functional design of the parlor. It can be a challenge to provide appropriate design in a remodeling project. Compromises in functional design should be critically evaluated in terms of cost effectiveness, and labor efficiency. It is also important to consider how the retrofit parlor option affects other aspects of the farmstead transition and potential expansion options. A retrofit parlor may or may not be the best option for all farms.

Four dairy farms varying in size from 75-150 milking cows were interviewed by the respective county agent. An outline was developed to describe the retrofit parlor construction project including family goals, options considered, construction process, facility features and costs, and personal observations. A plan view and cross section view of the parlor layout is included to describe the space utilization. This was a team effort between the state extension specialist, four county agents and the farm owners. A special thank you is extended to the farms that participated in the case study for their willingness to share their experience and expertise with those that read this paper and learn from it.

Denmar Ridge Dairy Farm, owners Dennis and Mary Rooney, children Brian and Tim and Pam Rooney, children Ashley, Levi, Alexis, Leighton

Interviewed by Vance Haugen, Crawford County Agriculture Agent

Dairy Operation Description

The Denmar Ridge farm is a family owned dairy operating as a Limited Liability Company. There are two families in the dairy business. The family has been in the dairy business since 1967. The farm is located in Steuben, WI. The farm currently milks 90 cows 2 times per day with no plans to increase the herd size since they expanded by 50% two years ago. 350 acres of cropland are used to produce all the forage and grain for the dairy cows. They are experimenting with rotational grazing on 26 acres of prime cropland. Replacement animals are raised on the site. The dairy cows are housed in a 65 free stall barn with an additional 21 stalls in the unused portion of the old barn. The cows are milked in a double 10 swing parlor. There are 2-1/2 FTE positions in the total farm enterprise. Dennis and Tim are both full time with Tim's children contributing the other 1/2 FTE. Both Dennis and Tim's spouses work off the farm.

Goals/Objectives

There were several goals identified when making a decision on what to build for the parlor. They included:

- Milk enough cows in a reasonable amount of time, using family labor.
- Make an adequate living wage for two families.
- Allow the senior partner to slow down on the farm and phase out of the operation.

Options Considered

There were several options looked at for the milking system. Numerous farms were visited. From these visits it was decided to consider a new flat barn or a swing parlor. The farmers considered retrofitting the parlor in the old stall barn or building a new structure for the milking system.

Final Decision

It was decided to retrofit a parlor into the existing barn. This was done for several reasons. The number one reason was the low estimated cost of a swing parlor retrofit. Secondly was the observed speed and efficiency of milking cows in the parlors that were visited. Additionally, and to a lesser consideration, the farmers didn't want to eliminate the existing manure storage structure. A new parlor structure would have been best positioned on the site of the existing manure storage unit. In addition, a new manure storage unit would have to go through a permitting process.

Milking Parlor/ Holding Area Description

Structure- The existing barn was remodeled to contain the swing 10 milking parlor, equipment room, palpation station, holding area, return alley, 21 free stalls, and a piston pump station. The dimensions of the existing barn are 34' x 160'. There were two single-story additions on the barn (built in 1925). The milk room is attached to the end of the barn and was not remodeled. (Please reference the plan and cross section views included.)

Demolition/Deconstruction- The farmers had to break out all the concrete where the parlor was poured. During the demolition the farmers hit one old barn wall that caused some problems. On most of the other areas including the palpation (management) rail, free stalls, and equipment room the original concrete was used. New concrete was kept to a minimum.

Carpentry- Three posts were moved to accommodate the new parlor layout. Three six inch I beams on steel posts support the king beams which in turn support the entire second story. The interior of the parlor is finished with plastic liner to allow easy cleaning. The holding area is separated from the parlor by two sliding doors and remains unfinished just as it was when it was a tie stall barn. The crowd gate is split to allow it to move between the two existing rows of posts.

Concrete- The farmers did all the major concrete work. The operator area, cow platform, floor slopes, and holding area floor, was done by Dennis and Tim between milking with help from their friends.

Milking Stalls- The stalls used in the parlor were made by the farmers. Chromed hydraulic rod cylinder was used. The swing stall design was taken from David Kammel's Swing Parlor paper and by observing other parlors in the area. The posts for the stall work were placed in concrete at the edges of the parlor pit. The frame for the detachers, vacuum line, and milk line are supported from the three I-beams used to hold up the main support beam for the barn. A swing detacher holding device was developed by the owners to keep the detacher and hoses from hanging in the middle of the operator area. This allows a clear path in the operator area. A butt pan or shield is not incorporated into the design because calm cows do not defecate greatly. A butt pan also limits the operators' visibility of the cows and makes the operator feel that they were milking in a cave. The chop/guillotine gate was home built.

Crowd gate- The crowd gate was farm designed and constructed. It consists of a slow speed drive motor and electrified chain and metal tubes. It is split to move down the length of the barn in two pieces between the two rows of posts. It is mounted so that the chains and tubes can be pushed to one side like a sliding door to allow cows to be loaded into the holding area. The farmers use the crowd gate at every milking to have the cattle move on the milking platform.

Milking System- The local milking equipment dealer worked with the Rooneys very well. There are ten units on a new three-inch mid line. They started with six milking units and purchased four used milking units. They also purchased ten used Westfalia detachers. They continued to use the same 7.5 horse vacuum pump. The new three-inch line was re-plumbed to the existing receiver jar. Nothing was traded with the dealer. The system also has a clean in place (CIP) system installed.

Milk cooling system- The existing 1000 gallon bulk tank was used as it was only three years old. Milk is picked up once per day. They now wish they had a bigger bulk tank. There is no precooler but heat is taken off the heat exchanger with a free heater system on the Freon side.

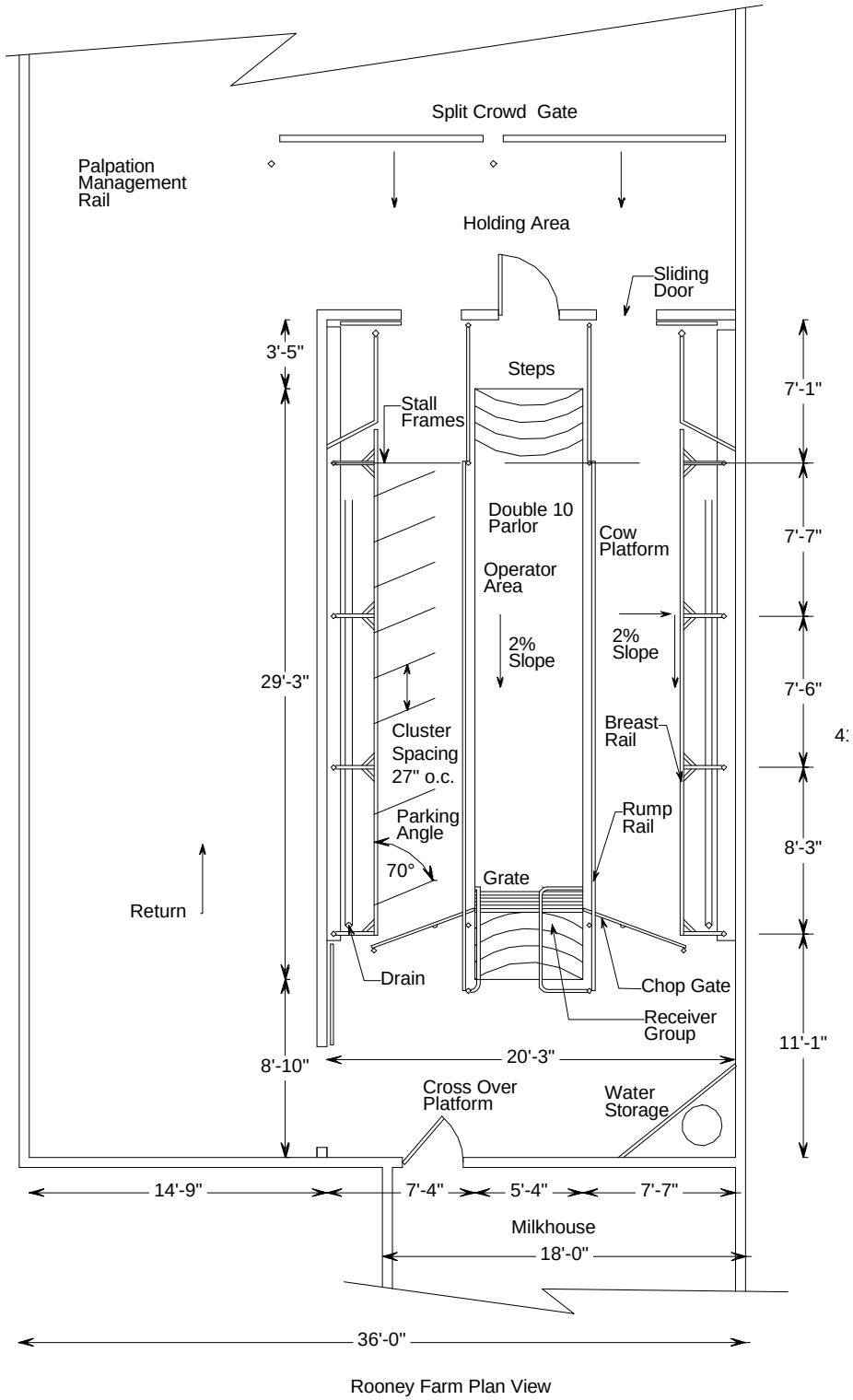
Lighting System- Additional florescent lights were added to achieve a good lighting result. Seven fluorescent fixtures were added to the parlor. One fixture is placed over the cross over lane at the front of the parlor. The remaining six fixtures are placed in two rows of three fixtures over the cow platform. Each fixture holds two 40 watt lamps for a total of 80 watts per fixture.

Manure Handling- All wash water and manure from the holding area is scraped by a skidsteer to the piston pump and pumped to a manure storage structure.

Parlor Cleanup- A high volume, low-pressure (80 psi) system is used. CIP wash water is recycled for cleaning the parlor. The volume of recycled CIP water is not quite enough for the cleaning needs. Approximately 60 gallons of additional water per day must be added to clean the parlor. Drainage for the parlor was done independently of the holding area. The parlor drains into a drain field, with grass buffer.

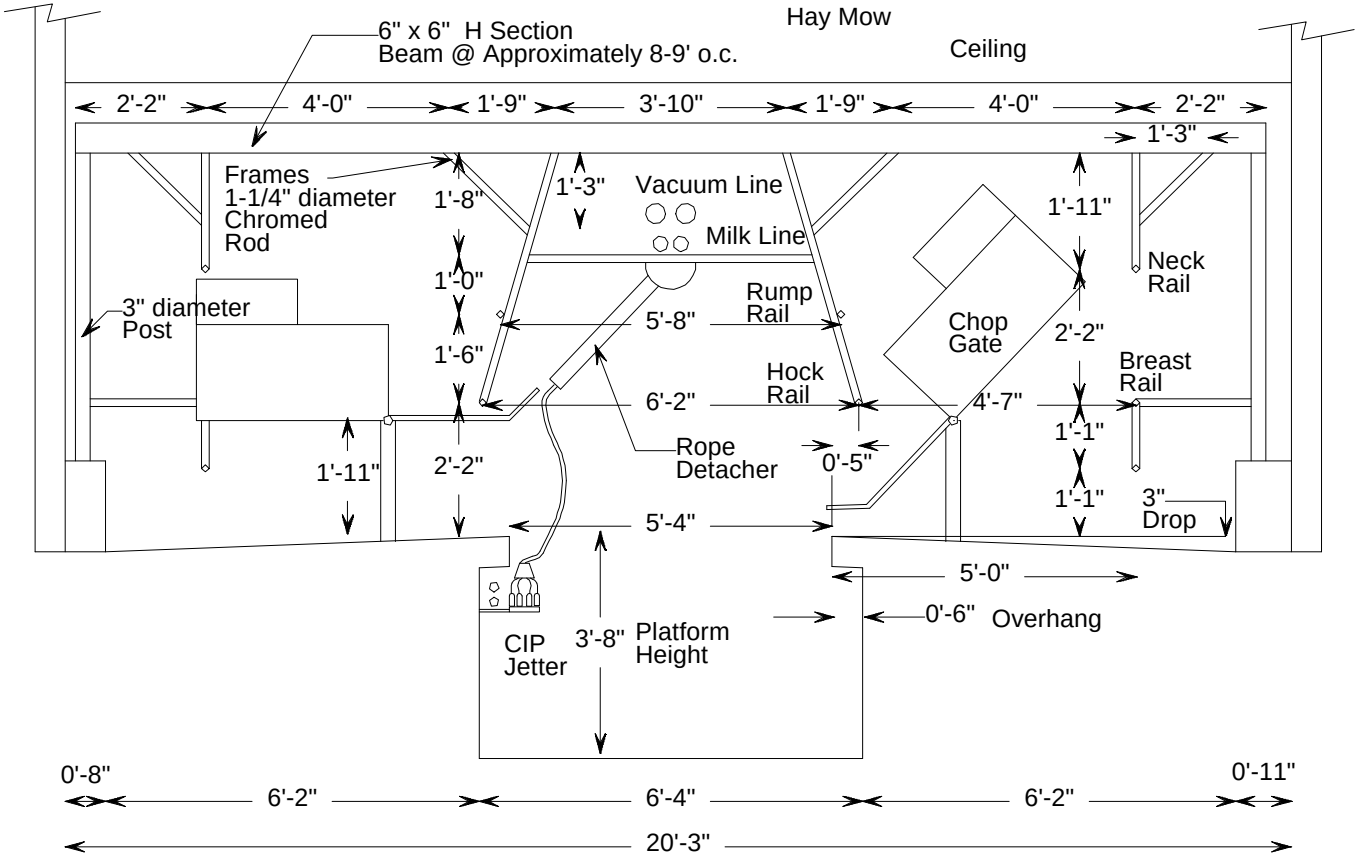
Waste Storage- The manure from the holding area and free stall addition is scraped to the main pit or to the piston pump transfer. The manure pit is 40’ x 85’ and tapers to an 8 foot depth. Manure is augured out four times a year.

Ventilation/heating System- An 80,000 Btu propane furnace is used to heat the parlor in the winter. Two ceiling fans are placed over the operator area.



Rooney Farm Plan View

Rooney Farm Parlor Plan View



Inside Wall Dimensions

Rooney Farm Cross Section

Rooney Farm Parlor Cross Section View

Parlor costs including estimated labor costs

Item	Cost		
	Materials or Equipment Rental	Labor	Total
Deconstruction(Demolition)	$1,000	$200	$1,200
Carpentry		$300	$300
Concrete	$7,000		$7,000
Milking Stalls and gates	$2,000		$2,000
Milking System (not including milk cooling)	$13,000	$3,000	$16,000
Milk Cooling Bulk tank			$0
Electrical	$1,000	$2,000	$3,000
Plumbing	$700		$700
Heating system	$300		$300
Ventilation System	$100		$100
Total Cost	$25,100	$5,500	$30,600

Construction Process

The project began in January of 1997 with considerable planning and was completed in March 1999. The project started with converting half the old barn in to a flat parlor (double six) in spring of 1997 so the cows could be milked while the free stall barn was completed. After the free stall barn was completed, then the swing parlor was constructed. The farmers were their own general contractors and supervised the entire construction process on the parlor. The free stall barn structure was constructed by a crew but the free stall and concrete work was done by the farmers. In addition there was help by numerous friends and neighbors and by the local Grazing Network. Getting all the slopes to come out right was difficult but the water runs were it should and there are no puddles in the parlor.

The First Milking

After one side was completed on the swing parlor, the milk cows were allowed to walk down it for several days before the first milking. The first milking took about 2-1/2 times as long as a normal milking had. The cows were nervous and therefore it was a messy situation. It went better than the farmers thought it would for the first milking. They had four extra helpers on hand to assist the cows with finding the platform and moving through the parlors. Getting the cows on the platform was the toughest task. On the second milking the farmers needed only one extra helper and within four milkings, things were okay, but after one month things were great.

Regular Milking Routine

One person milks in the morning and the other at night. At 5:45 am, it takes about 25 minutes to bring cows in from free stall and paddock. Another 15 minutes for setup of milking equipment, dipper, sprayer, etc. It takes approximately one hour and 15 minutes to milk. Clean up lasts about 15 minutes. Feeding cows and scraping takes 30 minutes.

The children are a big help but they are not present at every milking.

Cows are milked twice per day. There are two people on a milking shift of 2 hours per milking. One person is in the parlor and the other moves cows, scrapes alleys, and polices free stall platforms. It must be noted that this part of the routine only takes 40 minutes for the one farmer. The milking routine involves the following steps: a predip for 5 seconds, wipe off predip, attaching of unit, auto detachers are used , post dip for 10 seconds. The routine is done with 10 cows each step.

Milking system through put before and after construction of retrofit parlor.

Per Milking Shift	Before	After
Number milking cows	60	90
Number milking stalls	60	20
Number milking units	5	10
Number of people milking per shift	1	1
Number milkings per day	2	2
Setup time	15 min	15 min
Milking time	110 min	75 min
Cleanup time	15 min	15 min
Total Chore time	140 min	105 min
# cows/milking hour	33	72
# cows/person-milking hour	33	72
Production per cow, lbs/day	60	60

Summary and Personal Observations

Their favorite thing about the parlor is the simplicity of its operation. In addition the detachers have worked beyond their expectations. Udder health improved the day after they were installed.

Words of wisdom: If you can't stand to have a **little** manure on you, you can't make this (or any) parlor work.

HyJoDe Dairy Farm, owners Joe and Deb Gerke, children Joel and Emily, and Jason Hauser

Interviewed by Jim Leverich, Monroe County Agriculture Agent

Dairy Operation Description

The HiJoDe farm is a family owned dairy farm. There are two families in the dairy business The family has been in the dairy business on this location since 1956. The farm is located in Bangor, WI. The farm currently milks 170 cows 2x per day with no plans to increase the herd size. All of the forage and grain are raised on the farm's 410 acres of cropland. Replacement animals up to one year are raised on site and the yearling and bred heifers are raised on another nearby farm. The milking cows are housed in a three-row covered feed alley free stall barn. The dry cows and pre-fresh cows are housed in separate groups in another smaller three-row free stall barn. The cows are milked in a double 8 parallel parlor with swing line milking system that can be eventually upgraded to a low-line milking system. There are 2 ½ full time positions to run the dairy, heifer and cropping enterprises.

Goals/Objectives

There were several goals we identified when making a decision on what to build for the parlor. They included:

1. Reduce Physical Labor
2. Improve Cow Comfort
3. Improve Time Flexibility
4. Allow a new partner to enter the farming business.
5. Create Cow Management Groups
6. Improve Profitability

Options Considered

The producers looked at many options before deciding what to build with the local extension agent. They really didn't consider many options that were different than what they built. They decided early on that they wanted this to be an easy transition. They didn't want to become a large dairy, just large enough to meet their objectives. Business plan, cash flow and partnership structures were developed for the dairy.

Final decision

The families decided to build a new three-row free stall barn and remodel the existing barn into a new milking facility. They wanted a parallel parlor with automatic takeoffs. A concrete contractor, carpentry contractor, and a milking equipment dealer were used in the construction. The milking equipment dealer was the general contractor for the parlor.

Milking parlor/ Holding Area Description

Parlor- The existing dairy barn was retrofit for the parlor. The old concrete was removed from the barn to place new concrete in the retrofit parlor. The ceiling (hay mow floor) of the dairy barn was removed and a new parlor ceiling was framed and insulated. The existing milk house is used with an addition to bulkhead the new (used) milk bulk tank. The parlor and milk house walls and ceilings were lined with glass board for easy cleaning. The holding area was also built into the existing barn area and a palpation rail was added along the return lane. The existing concrete was removed and new concrete placed with the correct slope.

Milking Stalls- Blue Diamond Double 8 parallel stalls were installed by the milking equipment dealer.

Crowd gate- An electric crowd gate was purchased and installed by the milking equipment dealer. It is used for every milking but the electric fencer is rarely turned on.

Milking System- The milking system is a swing 8 with a new 2-1/2 inch milk line and receiver group. Eight Eclipse milking units (4 new milking units were purchased) with new Surge rope detachers and milk meters. The milking unit and detacher can slide from side to side of the parlor on a plastic PVC pipe over a horizontal strut. A new 5 HP vacuum pump was purchased. The milking equipment dealer rebuilt the milking system and installed the parlor stalls. A CIP system was also installed..

Milk cooling system- A 2000 gallon used bulk tank was purchased. Milk is picked up every other day. A pre-cooler is used and the water from the pre-cooler goes into a 1000 gallon tank which is used for parlor cleanup and for watering cows in a 500 gallon outside watering tank.

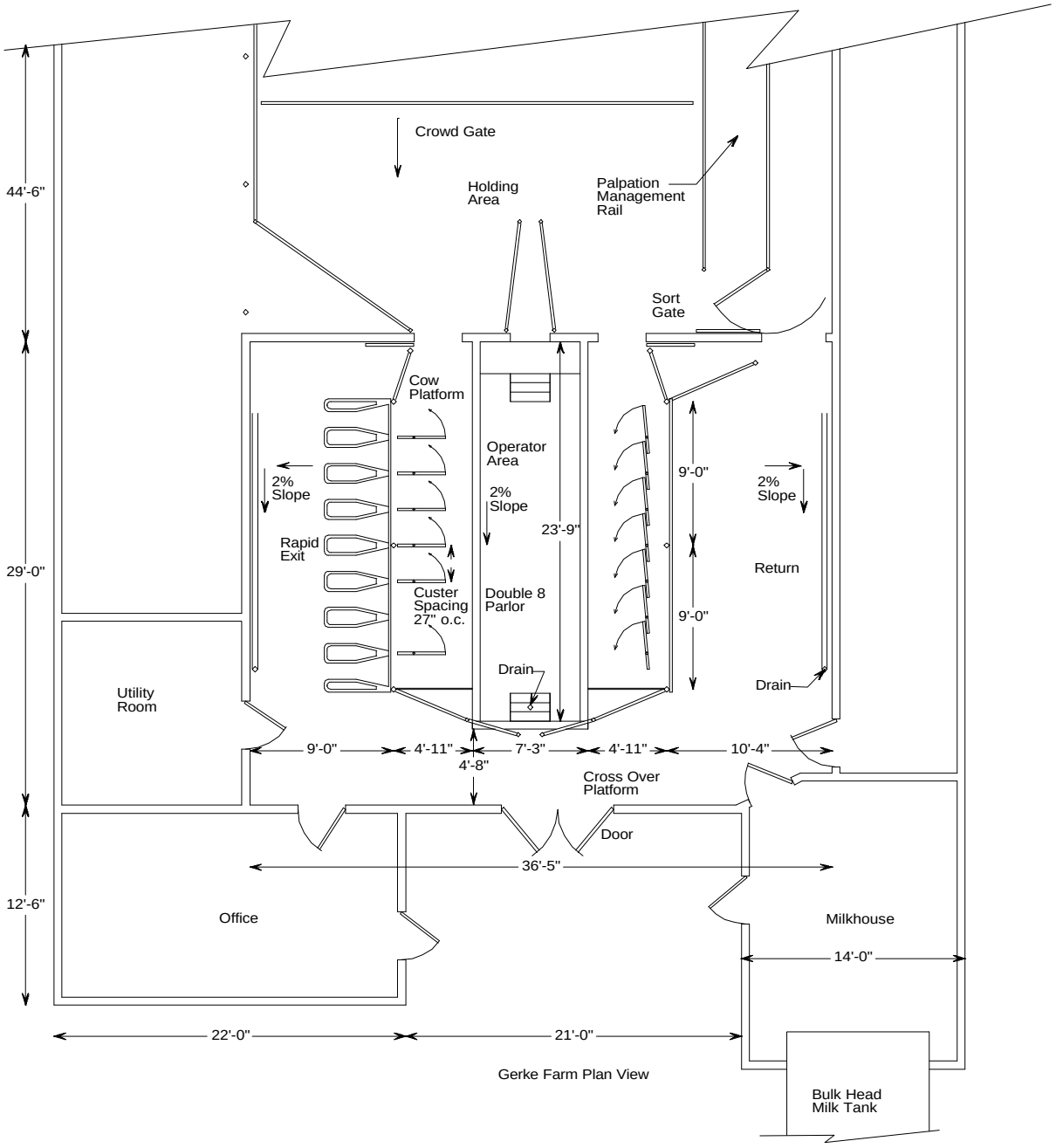
Lighting- Three rows of two 8’ long fluorescent fixtures were installed in the parlor. Each fixture is 150 watts for a total of 900 watts of light.

Manure handling- The holding area is scraped by hand to a door at the rear of the holding area adjacent to the barnyard. It is picked up by skidsteer and hauled daily.

Parlor cleanup- The parlor is cleaned with recycled plate cooler water with a high pressure low volume system. The water from cow platforms and operator area drain by gravity to a spreader and filter strip.

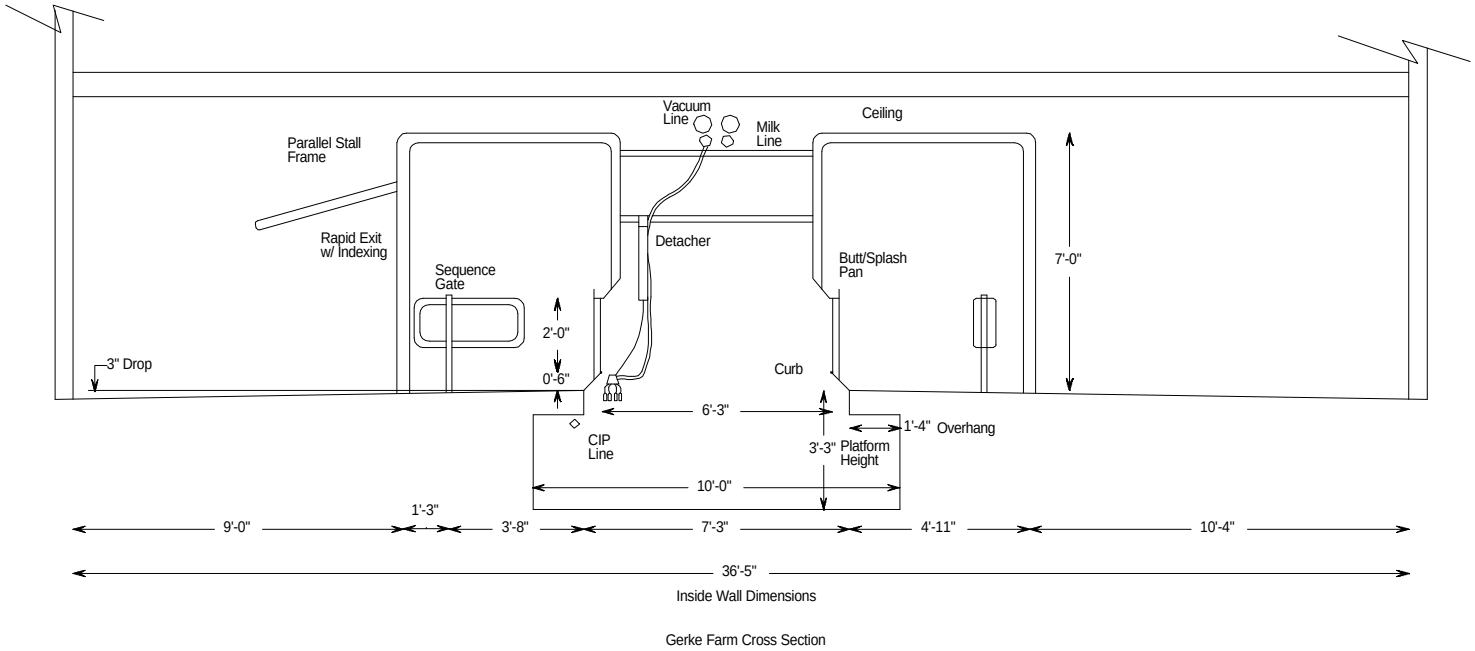
Waste storage- The water from washing the parlor is irrigated out on nearby fields all year around.

Ventilation and Heating System- A gas heater is used to heat the parlor in the winter. A large barn fan on wheels is used in the parlor doorway for summer ventilation.



Gerke Farm Plan View

Gerke Farm Parlor Plan View



Gerke Farm Cross Section

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Gerke Farm Parlor Cross Section View

Parlor costs including estimated labor costs

Item	Cost		
	Materials or Equipment Rental	Labor	Total
Deconstruction (Demolition)		$4,000	$4,000
Carpentry	$9,000	$9,000	$18,000
Concrete	$6,000	$6,000	$12,000
Milking Stalls and gates	$16,000	$2,000	$18,000
Milking System (not including milk cooling)	$11,000	$4,000	$15,000
Milk Cooling tank	$18,000		$18,000
Electrical	$2,000	$1,500	$3,500
Plumbing	$2,500	$2,500	$5,000
Heating system	$1,000	$1,000	$2,000
Ventilation System	0	0	0
Total Cost With bulk tank	$47,500 $65,500	$30,000 $30,000	$77,500 $95,500

Construction Process

The planning started in October and the parlor was operational by mid April. There was a lot of planning with the contractors to minimize downtime. The county agent had a meeting with all the contractors involved to develop a construction schedule. Each contractor agreed to find construction date when they could each start and finish their responsibility and not leave the project until their part was complete. This reduced the possibility of the project starting and then being held up by a contractor that went off to start another job. Nine days after demolition began the project was completed. Cows were milked in half of the barn for about 1 week in 11 stalls for 4 milkings. Three contractors were involved and they all worked together very well. The milking equipment dealer acted as general contractor.

The First Milking

There was additional help available for the first milking. The cows were also used to being switched in the old system. Nine people were on hand for the first two milkings and they calmly moved the cows into the new parlor. The cows were quite used to the parlor after four days and were very comfortable with the parlor after one month.

Regular Milking Routine

Jason milks the cows now and Joe moves the two cow groups, feeds the cows and scrapes manure in the free stall barns. Cows are milked 2 times per day in about 3 hours. The milking routine involves forestripping and predipping 8 cows, wiping 8 cows and then attaching 8 cows.

Milking system through put before and after construction of retrofit parlor

Per Milking Shift	Before	After
Number milking cows	100	150
Number milking stalls	52	16
Number milking units	6	8
Number of people milking per shift	2	1
Number of milkings per day	2	2
Setup time	5 min	5 min
Milking time	180 min	150 min
Cleanup time	30 min	30 min
Total Chore time	215 min	180 min
# cows/milking hour	33	60
# cows/person-milking hour	17	60
Production per cow, lbs per day	60 lbs	70 lbs

Summary and Personal Observations

Labor efficiency, profitability, cow comfort, time flexibility and physical labor demands are all better.

Dayton Ridge Dairy Farm, owners Bert and Trish Paris

Interviewed by Mark Mayer, Green County Dairy and Livestock Agent

Dairy Operation Description

The Paris family farm is a single family farm operated as a husband and wife partnership. The family has been in the dairy business since 1983 and purchased their current farm in 1992. The farm is located in Belleville, WI. The farm currently milks 75 cows 2x per day with plans to increase the herd size to 80-85 within the next 2-3 years. The farm uses an intensive rotational grazing system on 130 acres to provide the forage needs for the herd. All grain is purchased. Replacement animals are raised on the site. The dairy cows are housed on pasture for the majority of the year . A canvas hoop building with a bedded pack is used during the winter evenings and hot summer days. The cows are milked in a New Zealand swing ten parlor. There are 1.25 FTE positions in the dairy enterprise with all labor being provided by family members.

Goals/Objectives

There were several goals we identified when making a decision on what to build for the parlor. They included:

1. Reduce Physical Labor
2. Wanted a Low Cost Option to Efficiently Milk Cows
3. Eliminate the Need to Run Groups of Cows in Old Stall Barn
4. Improve Time Flexibility

Options Considered

There were several options looked at for the parlor. They considered a flat barn parlor inside the old barn, but opted for a pit parlor. A new parlor located outside of the old stanchion barn was not considered due to additional cost. They compared a parallel vs. a swing type parlor and decided on the swing parlor due to cost advantages.

Final decision

The Paris family decided to go with the swing parlor due to cost savings over a parallel. The decision to put the parlor inside the old stall barn was made because the barn did not have adequate stalls for milking all the cows at one time. Constructing the parlor in the stanchion barn allowed them to use a structurally sound building and to make use of the present milk house and milking equipment. This decision also eliminated the extra cost of building a separate building to house the parlor and holding area.

Milking parlor/ Holding Area Description

Parlor – The existing 34’ X 100’ stanchion dairy barn was built in 1937 with an addition made in 1967. The barn was retrofit for the parlor by knocking out the old stanchions, moving support posts for the king beams and filling the barn cleaner gutters with sand and concrete in the holding area. The original ceiling was left in tact and painted plywood was used for the walls. The holding area was built in the old center driveway. Milking stalls, chop gate and parlor frames were home built from new steel. Butt pans were originally installed and removed about six months later to provide better cow visibility when milking. Cows are identified with a freeze brand on the upper portion of the rear flank, just to the side of the tail. The pans made it difficult to ID cows during milking.

Treatment/Calving Barn - Self locking head gates were installed into an existing 40’ X 40’ treatment/calving building located adjacent to the barn that is used for breeding and working cows. This building is also used as a calving area for the herd.

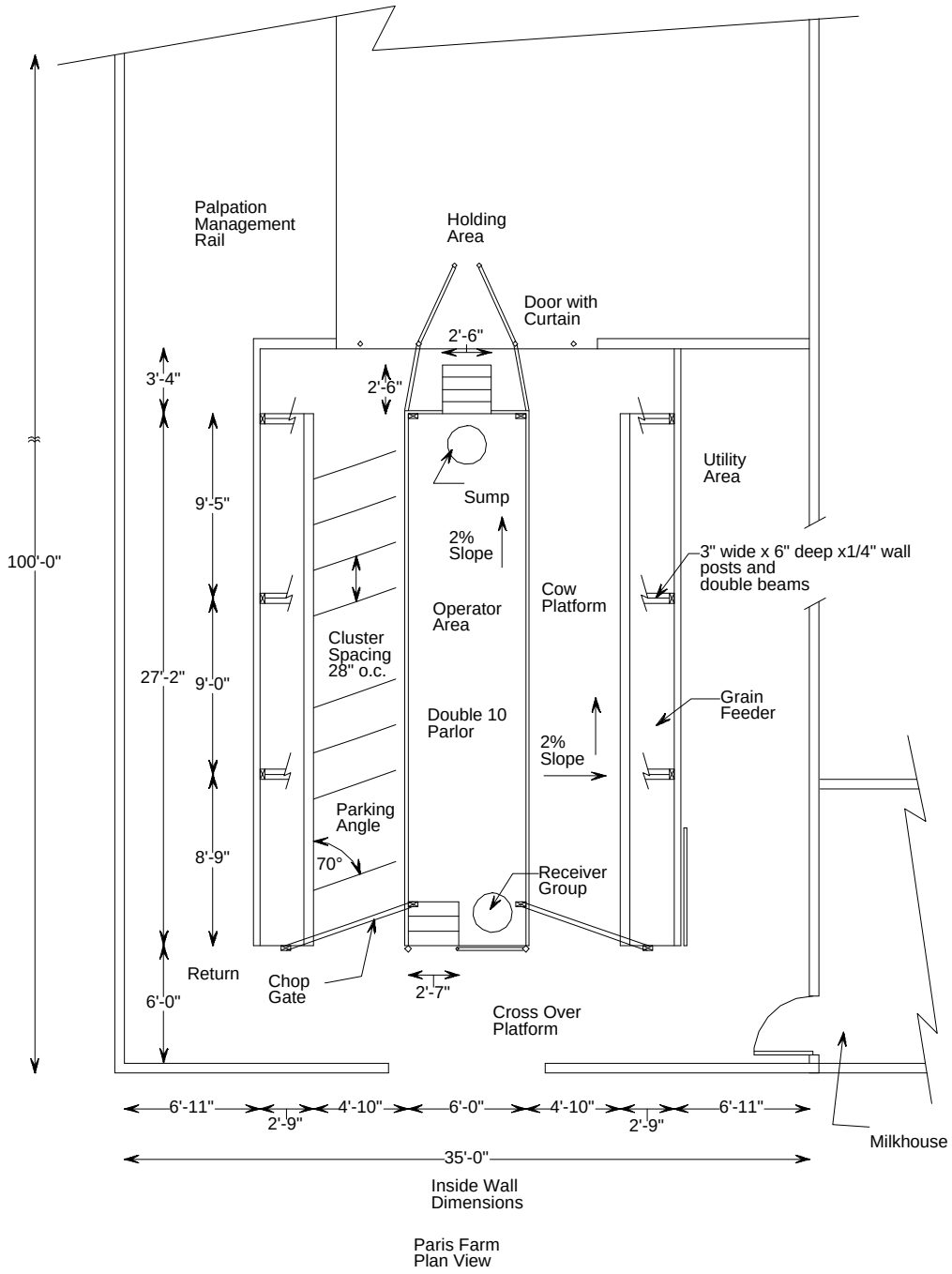
Cow Housing - The cows are housed in a 34’ x 120’ bedded-pack hoop building that is located about 200 feet from the parlor. They are housed on pasture for the majority of the year with the building being used mostly on winter evenings and hot summer days.

Milking System - The original milk house was used. A new (used) 800 gallon bulk tank and cooling system was installed in 1998 and a pre cooler was added a year later. Milk is picked up daily in summer months and every other day in winter months. The water from the pre cooler is used for drinking by the cows. Five additional used milking units were purchased to bring the total to ten. Detachers were not installed. The original 7.5 HP vacuum pump was reused. The system was installed by a dealer and is designed for clean in place.

Feeding/Lighting - An automated grain feeding system was installed in the parlor. Due to the fact that grain is fed in the parlor a crowd gate was not installed and has not been needed. Additional sealed fluorescent lighting fixtures were also added in the parlor area.

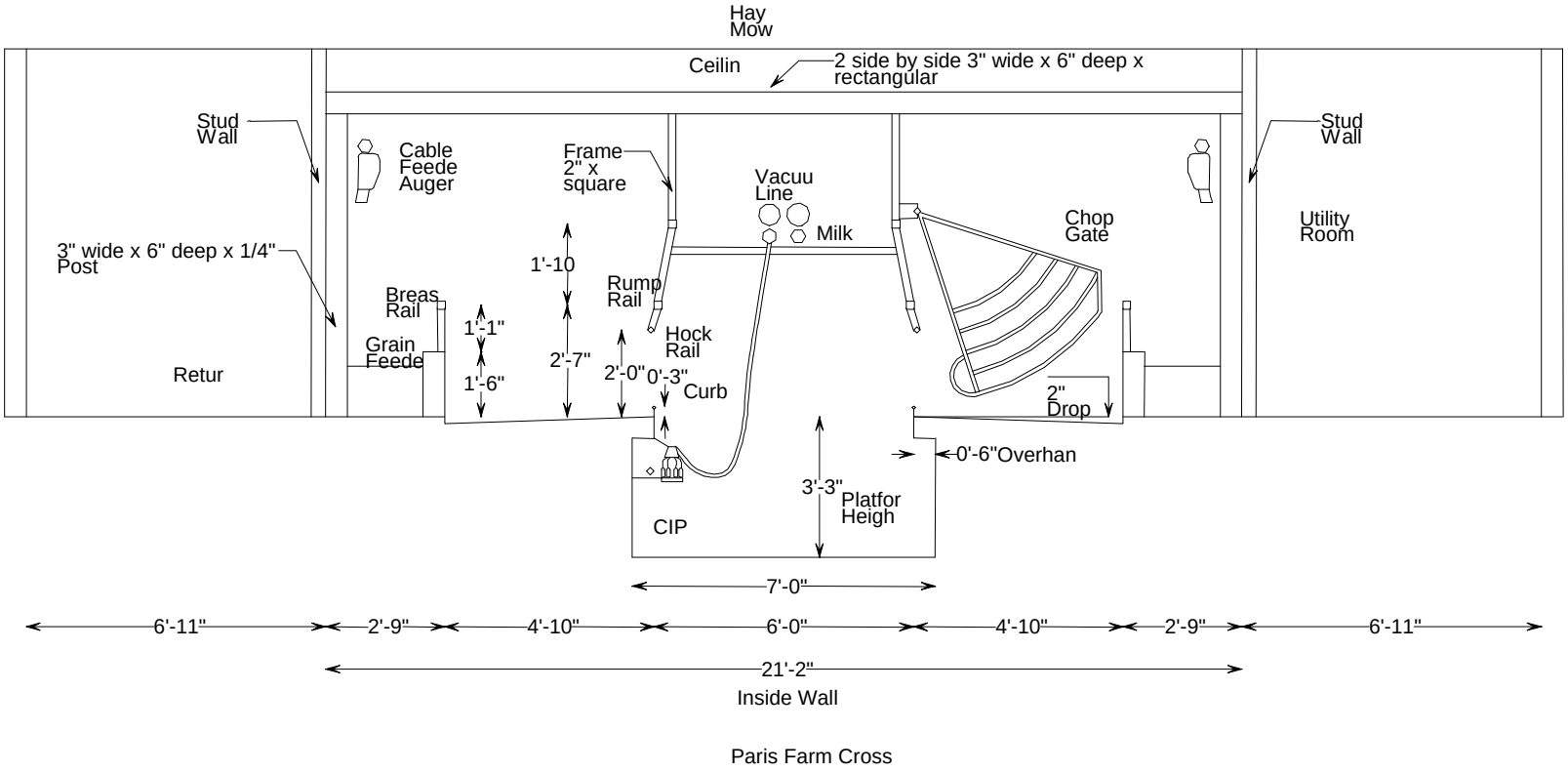
Concrete – Old concrete was knocked out by a hired contractor in five hours. A contractor was hired to frame and pour cement. Parlor floor, and cow platform were sloped for easy cleaning. Original concrete was left in the holding area.

Manure handling- Holding area is cleaned by hand scraping. The parlor is cleaned by first removing excess manure with a squeegee and is then washed down with a ¾” garden hose. The parlor wash water is stored in a 300 gallon tank equipped with a pump to provide added water pressure for cleaning. The dirty wash water is pumped to a 7,000 gallon storage tank. The tank is emptied every 2 months by spreading on pasture land.



Paris Farm
Plan View

Paris Farm Parlor Plan View



Paris Farm Cross

Paris Farm Parlor Cross Section View

Parlor costs including estimated labor costs

	Cost		
Item	Materials or Equipment Rental	*Labor	Total
Deconstruction (Demolition)	$250	$750	$1,000
Carpentry	$800	$1,200	$2,000
Concrete	$3,500	$3,500	$7,000
Milking Stalls and Gates	$4,000	$6,000	$10,000
Milking System (not including milk cooling)	$1,000	$1,000	$2,000
Milk Cooling & Bulk Tank	$6,000	$0	$6,000
Electrical	$500	$500	$1,000
Plumbing	$400	$600	$1,000
Heating	$1,200	$800	$2,000
Total Cost With Bulk Tank	$11,650 $17,650	$14,350 $14,350	$26,000 $32,000

* Does not include own labor. Own labor estimated @ 30% of total cost.

Construction Process

One way to keep costs down is to provide owner labor to reduce labor costs. The Paris family provided approximately 30% of the labor and also served as the general contractor. The planning for the parlor started about three years before construction and included several visits to other farm operations. The actual transition time once the parlor construction started took 3 weeks. During the construction period the cows were milked in 14 stalls that were kept in the back of the barn. The biggest headache during this period was living without a barn cleaner meaning that manure had to be handled by hand. Their was also extra labor caused by having to run more groups of cows in and out of the limited number of stanchions for each milking.

The First Milking

A total of six people were present for the first milking. It took 1.5 hours to milk 35 cows during the initial milking. Cow flow into the parlor was not a large problem after the first few days due to grain being fed in the parlor. It took the cows about two weeks to become comfortable with the parlor.

Regular Milking Routine

Cows are milked 2x per day. There is one full time milker in the parlor along with a part time family helper. One person is in the parlor and the other moves cows, dips and helps with machines when needed. The setup, clean up and milking labor was reduced and the number of cows milked/hour increased by 30 after the parlor was installed. Fresh/sick cows are milked with a bucket.

Milking system through put before and after construction of retrofit parlor

Per Milking Shift	Before	After
Number milking cows	47	75
Number milking stalls	37	20
Number milking units	5	10
Number of people milking per shift	1.5	1.5
Number milkings per day	2	2
*Setup time	35 min	15 min
Milking time	90 min	60 min
**Cleanup time	90 min	30 min
Total Chore time	215 min	105 min
# cows/milking hour	31	75
# cows/person-milking hour	21	50
Production per cow, lbs per day	55	50

*Includes grain feeding, **Includes manure hauling

Summary and Personal Observations

The parlor has increased the number of cows milked per hour, while at the same time reducing labor requirements. The reduction in labor has resulted in less physical stress and increased family time. They are very happy with the parlor. The only minor modification they would change in the parlor would be to develop a better way to handle the manure in the holding area.

Scott and Teresa Brickl, Hillsboro, WI

Interviewed by Tim Rehbein, Vernon County Agriculture Agent

Dairy Operation Description

Scott and Teresa share-rented the farm they are currently on from 1986 to 1995. The farm is located in Greenwood Township near Hillsboro, Wisconsin. The farm consists of 140 tillable acres and a 46 stanchion dairy barn. They also rent 80 acres. The dairy barn was a typical stanchion barn consisting of two parts. The original barn is a timber framed structure with stone walls housing 30 stanchions with narrow feed alleys and low ceiling. A post frame addition was constructed in 1978 to add more stanchions. The addition was added to milk more cows in order to pay for the manure storage structure and the upright silo.

The farm was purchased by Scott and Teresa in 1995. From 1995, until summer of 2000, the 46 cow herd was housed and fed in the existing facility. Cows were milked with a 2 inch pipe line system and fed with a wheel barrow in a traditional top-dress feeding program.

The 2000 modernization project included a new free stall facility, retrofit parlor, TMR mixer and manure storage facility. Feed is stored in silo bags and a drive-over silage pile. High moisture shelled corn is stored in an upright oxygen limiting silo. The only crops grown are corn silage and alfalfa. High moisture shelled corn is purchased directly from neighboring farmers from the field. Corn silage is custom harvested.

Dry cows are placed on pasture during the grazing season and housed at another location during the winter. Close-up cows are now brought into a pen in the new free stall barn 2 weeks pre-calving. Heifer calves are housed on the farmstead in group pens. Some heifers are custom raised by a neighbor and some are grazed during the summer months on the home farm.

Scott and Teresa do all the milking and related chores. They employ 2 part-time employees. One of them is a high school student hired mainly to do odd jobs and calf chores. The other employee is the farm's previous owner who helps mainly with the field work.

The current herd size is 75 cows with room to house up to 110 cows in free stalls. In 1999, a group of heifers weighing 700# was purchased and bred and are now calving. The plan calls for a total of 120 cows with 100 milking at any one time.

Goals and Objectives

Teresa is currently working off the farm and wanted to work more at home and into the farm business. Scott and Teresa made the decision to stay in the dairy business and knew they had to modernize. A shortage of labor needed to be addressed. They wanted a system that allowed them to more easily hire part-time milking help in order for them as a family to take time off. Knowing that Teresa would do more of the milking, she toured parlors and farms with Scott to determine what style they wanted.

Another main goal was debt management. Because of existing debt from the purchase of the farm, money spent on the modernization project had to be controlled.

Options Considered

Business plans were developed for the following three options:

Option 1 - The first option looked at was a new free stall barn and new milk house in the old stall barn, a new double 8 parlor in the old stall barn and build on a new holding area. The cost of this option was $275,000.

Option 2 - The second option was to build a new free stall facility and a new milk house and a new parlor. The cost of this option was $310,000.

Option 3 - The third option consisted of a new 3-row, 100 free stall facility for $128,000 and a retro fit parlor and holding area into the “post frame addition” portion of the old stall barn. The milk house was not touched. A double 6 high line swing rapid exit parallel stall parlor was installed. Blue Diamond parallel rapid exit stalls were installed. Two more used milking claws were purchased as well as 6 used detachers. Much of the existing 2 inch pipeline was used in the retro fit. Cost of the retro fit parlor was $75,000. Total cost of option 3 is $203,000.

Final Decision

Option 3 was selected based on meeting the basic requirements of milking and housing cows and cost. A new clay lined liquid manure storage facility was also constructed with major financial help from the Hillsboro Lake Watershed Project. Total installed cost was $45,000 for a 235 day storage facility.

The main reason for selecting the total modernization project was cost. The second reason for selecting the retro-fit parlor and holding area was also cost. Cost had to be controlled and yet it had to be a turn-key system. Scott and Teresa had little time to commit to the project. The type of parlor selected would still allow good through-put and by constructing it with the future in mind, it can easily be converted to a low line milking parlor. The third reason is Scott and Teresa liked how the used stainless steel “fit” their needs. They feel it meets the needs of the “owner-operator” to do the milking.

Milking Parlor and Holding Area Description

Structure- The parlor was not built into the stone walled barn because of the low ceiling and there were too may support posts that would have had to be moved. The newer post frame addition was more accepting to the retro fit parlor because it could be easily converted into a clear span post frame structure. This limited the size of the parlor they could fit into the space, so they decided to install a double 6 instead of a double 8. The second story hay storage above the parlor/holding area will be abandoned and insulation installed. Hospital pens will be constructed in the old stanchion barn. The milk house stayed the same which saved on costs. A utility room was added to house the air compressor, washer and drier, heat system and the plate cooler water holding tank. It was constructed in the old stone walled section of the barn.

Demolition- The existing stanchion barn, maternity pens and manure pump were removed by a subcontractor. Walls stayed the same and the ceiling supports were reinforced to allow for a clear span across the parlor and holding area. Some demolition of the stanchions, pipes and pens were taken out with farm labor. The heating system and parlor ceiling will be installed with farm labor. Very little sweat equity was put into the project.

Carpentry- Some truss support was added to be on the safe side. Support posts for the hay loft floor joists were removed. The hay loft is abandoned. A subcontractor did the carpentry work.

Concrete- The same subcontractor who did the demolition, did the concrete work. New floors were poured for the holding area and cow platform.

Milking Stalls- Blue Diamond Cascade Parallel double 6 stalls were purchased. The stall support posts were placed into the concrete floor. The stalls have cow indexing and a butt/splash pan. Scott and Teresa would not milk in a parlor with out one. The parlor was designed to be converted over to a low line system.

Crowd Gate- A crowd gate has not been installed, at this point in time. Scott is currently designing a crowd gate for "self construction" this winter. "I just can't see spending $10,000, I'll build my own". The lack of a crowd gate does add to milking time to some degree. Holding area fencing consists of swing gates between the posts to access the return lanes, if needed.

Milking System- The milking system is a high line swing with 6 milking units and used detachers. The original 2 inch pipeline was used from the old system. Two used milking units were purchased along with the used detachers. Cows are identified with ear tag numbering system. They used their existing vacuum pump. The DeLaval dealer served as the general contractor for the milking parlor/holding area project. Scott believes he could have saved some money by serving as the general contractor. But after seeing how well the subcontractor crews of the general contractor worked and communicated, the money he would have saved could have been lost to time later with waiting for

subcontractors. Milking units are still taken into the milk house for cleaning because the parlor area still does not have a ceiling. The parlor ceiling will be installed this winter with farm labor to allow clean in place.

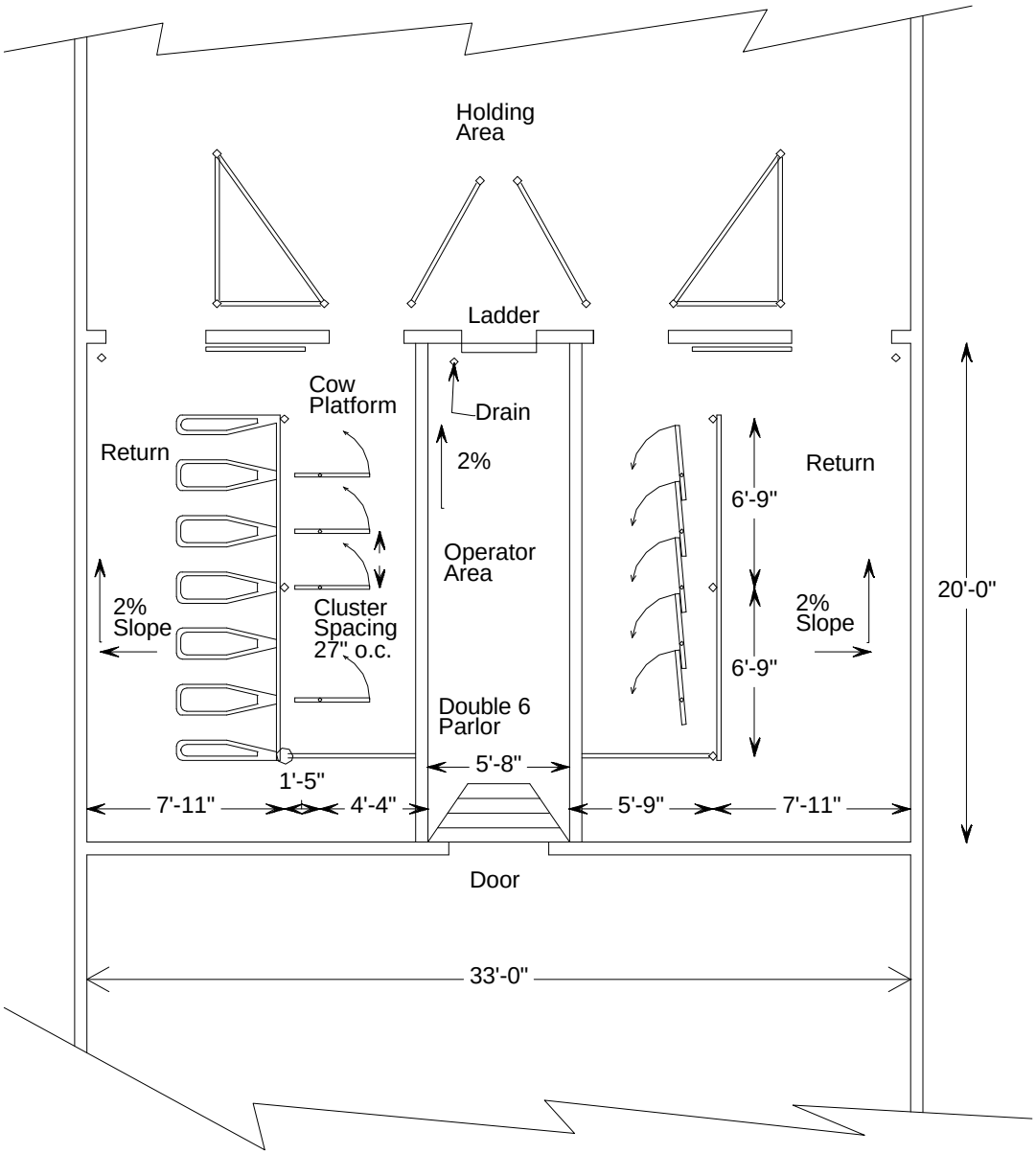
Milk Cooling System- The bulk tank is large enough to handle the current herd size. A larger bulk tank will be addressed later when total milk output dictates. A plate cooler was installed. They are currently using their existing 800 gallon bulk tank.

Manure Handling- The holding area is scraped with a skid steer and the return lanes are scraped by hand. The manure from the holding area is currently scraped out into the yard for temporary holding until it is loaded out in a spreader. A system to pump the manure from the holding area into the new manure pit will be added later.

Parlor Cleanup- The parlor is washed down after every milking. Plate cooler water is stored in a 1000 gallon plastic holding tank in the utility room. A high pressure, low volume spray system is used.

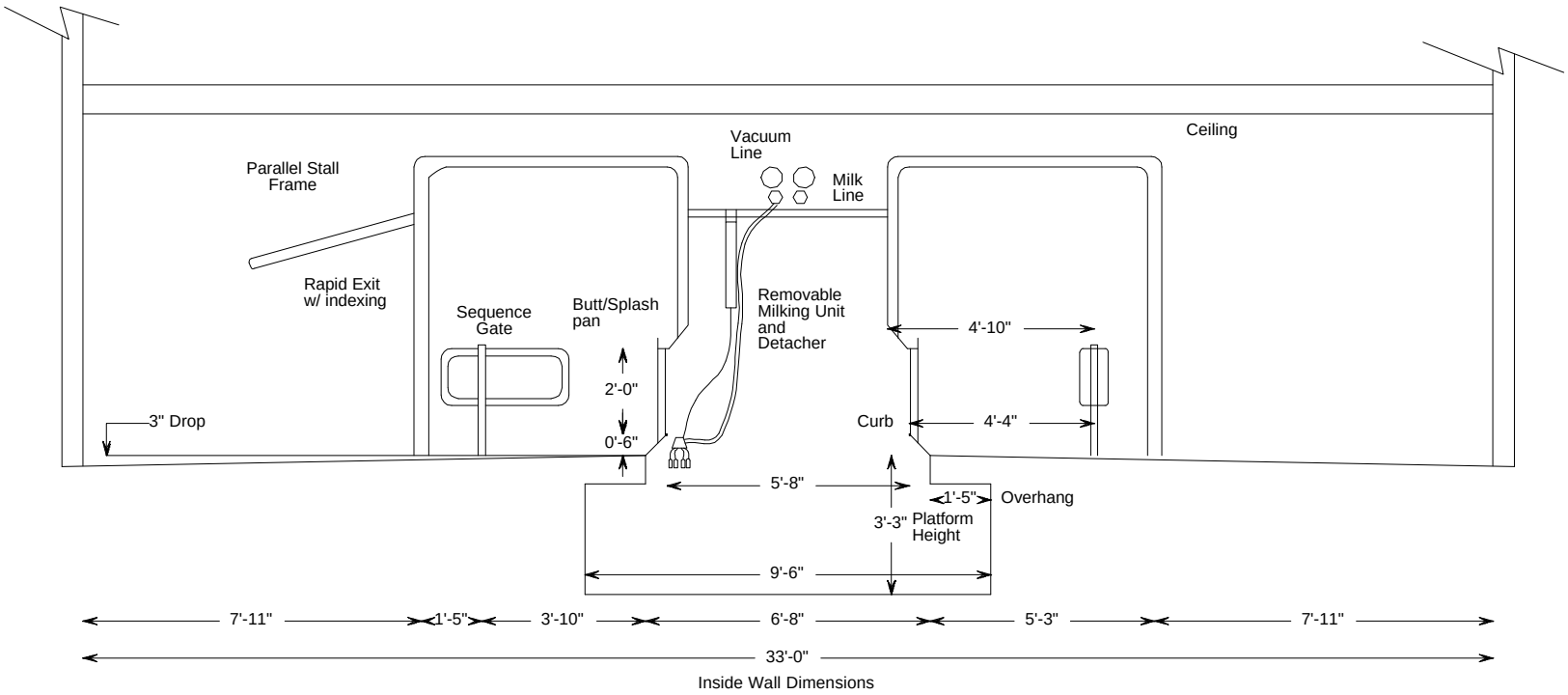
Waste Storage- Parlor waste water is pumped into the manure pit.

Parlor Costs-Total cost of the parlor retrofit project was $78,000. It was a lump sum contract bid, so it was impossible to separate out the individual parts of the parlor cost.



Brickl Farm Parlor Plan View

Brickl Farm Parlor Plan View



Brickl Farm Parlor Cross Section

Brickl Farm Parlor Cross Section View

Construction Process

Planning started in 1995 for the modernization. After many farm tours of existing facilities, the first estimates and business plans were written in winter of 1999. The final FINLRB business plan was drafted in late spring of 2000. Construction started in July of 2000 with excavation for the free stall facility. Cows were moved into the barn on September 29, 2000. The parlor construction started on August 8 and the first cows were milked in the parlor on August 23, 2000. During construction, milking was done in shifts in the old stone walled structure. "This was no fun and rough....very hard to describe".

The First Milking

"It's not the first milking...it's the first 2 weeks that are shear h_ _ _ !" There were 6 people involved for the first milking, 3 milking and 3 moving cows and in the holding area. Lining up a lot of help for the first milking really helps. Some cows had to be pushed into the parlor but never had to use a halter. "Now that I look back on it, there were no major problems, just a lot of adjustments....the cows adjusted better than I did." The electrician always seemed to show up at milking time and had various circuits tripped, such as the air compressor so cows could not be released. By the end of 4 weeks the milking routine settled down.

Regular Milking Routine (if you can call it regular after only 2 months)

The 75 cows are milked twice a day with Teresa doing the milking and Scott moving cows and scraping alleys. Milking starts at 5:00 a.m. in order for milking to be completed so Teresa can go to her regular day job. (She intends to quit after cow numbers are increased). The milking routine involves: a pre-dip, wipe off of pre-dip, fore strip, attach units with auto detachers. The routine is done with 3 cows each step.

Milking system through put before and after construction of retrofit parlor

Per Milking Shift	Before	After
#milking cows	46	75
#milking stalls	46	12
#units	4	6
Number of people	1	2
#milkings per day	2	2
Setup time	15 min	15 min
Milking time	90 min	105 min (No crowd gate)
Clean up	15 min	15 min
Total time	120 min	135 min
#cows/milking hour	31	43
#cows/person-milking hour	31	21
Production per cow	NA	72

Summary and Personal Observations

My favorite thing about the parlor is being able to milk 75 cows alone when needed in less than 2 hours. "I am still finding my favorite things to do ...like feeding cows". Another favorite thing is Teresa not getting kicked. My biggest concern is how things are going to go for my first winter. There are no pleasant surprises yet. Be ready for construction adjustments and getting a lot of manure splattered on you the first couple of weeks. Before cows were managed for health in the stanchion barn and now they are managed for health in the free stall barn with head locks.

What would you do different - Have manure scraping equipment ready to go the day the cows go into the free stall facility. Also better manure handling for the holding area if it could be afforded. Anything else different for the same money...no.

Disappointments- Cows still have enough room to kick off the units.

Closing comments - "Three weeks ago I would have said don't do it, now that's different. I am coming around. I already forgot my milking routine from the stanchion barn". "The work we are doing for 75 cows (now in a free stall/parlor set up) doesn't seem like we are doing the right amount of work (a sense that we should be doing a lot more)".