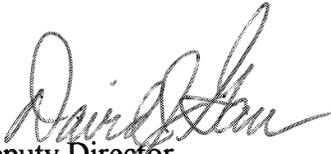


# Memorandum

To: Mr. Timothy W. Boyer  
Interim Executive Director

Date: October 15, 2003

From:   
David J. Gau, Deputy Director  
Property and Special Taxes Department

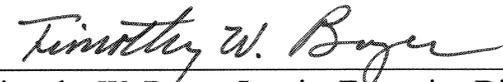
Subject: ***Assessors' Handbook Section 534, Rural Building Costs  
(November 19, 2003 Administrative Consent Agenda)***

I am requesting that Assessors' Handbook Section 534, *Rural Building Costs*, be approved for publication. Revenue and Taxation Code Section 401.5 requires the Board to issue to county assessors data relating to costs of property to promote uniformity in appraisal practices and in assessed values throughout the state. Pursuant to that mandate, staff developed the January 2004 version of AH 534 that contains current cost data for rural buildings and equipment.

Please place this item on the Board's November 19, 2003 Administrative Consent Calendar for approval.

DJG:sk  
Attachment

cc: Ms. Deborah Pellegrini

Approved:   
Timothy W. Boyer, Interim Executive Director

BOARD APPROVED  
at the \_\_\_\_\_ Board Meeting

\_\_\_\_\_  
Deborah Pellegrini, Chief  
Board Proceedings

ASSESSORS' HANDBOOK  
SECTION 534

RURAL BUILDING COSTS

JANUARY 2004

---

CALIFORNIA STATE BOARD OF EQUALIZATION

CAROLE MIGDEN, SAN FRANCISCO

BILL LEONARD, ONTARIO

CLAUDE PARRISH, LONG BEACH

JOHN CHIANG, LOS ANGELES

STEVE WESTLY, SACRAMENTO

FIRST DISTRICT

SECOND DISTRICT

THIRD DISTRICT

FOURTH DISTRICT

STATE CONTROLLER

TIMOTHY W. BOYER, INTERIM EXECUTIVE DIRECTOR



## FOREWORD

This edition of Assessors' Handbook Section 534, *Rural Building Costs*, updates some costs contained in previous editions and includes new data. As with prior editions, pages are printed in loose-leaf form to allow for insertion of revisions by section or page.

There are increases throughout the state for permits and fees to construct buildings. Because of the variations in costs both within and among the counties, it is incumbent on the appraiser to research and analyze permits and fees of jurisdictions within the region and to make adjustments accordingly. In other words, AH 534 should serve as a guide, but an appraiser must research the market to determine which costs are most applicable for the appraisal assignment and temper the data provided in the AH 534 with local cost data.

General instructions and pertinent information concerning the use of this handbook are contained in an introductory section. Specific instructions and comments applicable to each building type will be found in the introductory pages of the section of the manual devoted to that particular type.

Although diligent efforts have been made to supply accurate and reliable information, it is very important to temper this data with local costs, since construction costs may vary both within and among counties.

This revision was prepared by Assessment Policy and Standards Division staff under the direction of the Property and Special Taxes Department.

David J. Gau  
Deputy Director  
Property and Special Taxes Department  
State Board of Equalization  
January 2004

# TABLE OF CONTENTS

INTRODUCTION .....	AH 534.00
BASIC FARM BUILDINGS .....	AH 534.10
DAIRY BARNS .....	AH 534.20
POULTRY HOUSES .....	AH 534.30
IRRIGATION SYSTEMS .....	AH 534.61
PUMPS .....	AH 534.62
CORRALS AND FENCES .....	AH 534.71
GREENHOUSES .....	AH 534.75
LAND DEVELOPMENT AND DRAINAGE TILE .....	AH 534.76
VINEYARD STAKES AND TRELLISES .....	AH 534.77
STEEL BUILDINGS .....	AH 534.78
MISCELLANEOUS COSTS .....	AH 534.79
WIND MACHINES .....	AH 534.80
DEPRECIATION .....	AH 534.90

# AH 534.00: INTRODUCTION

## BASIS OF COST

Costs in this manual are based on the cost to build on a level and cleared site in California as of the date at the bottom of each page. The costs are contingent on the following assumptions:

- A clear site
- Normal soil conditions
- Adequate site drainage
- Excludes all off-site improvement cost

The costs in this handbook include normal expenses incurred in placing the improvement or component in the hands of the ultimate consumer including the following:

1. Excavation for foundations, piers, and other structural foundation components
2. Materials
3. Labor
4. Architects' fees
5. Engineering fees
6. Supervision
7. Permits for improvements, land use, environmental impact, etc.
8. Normal utility hook-ups, if any
9. Contractor's overhead and profit
10. Contingencies
11. Carrying charges during construction, e.g., taxes, interest
12. Legal expenses
13. Typical sales commissions, costs, and transfer fees

All data are in the form of in-place costs for improvements and additives that may differ between various structures. The costs in this handbook do not include entrepreneur's profit.

## **AH 534.10: BASIC FARM BUILDINGS**

This section contains specifications and costs for various basic farm buildings including the following:

- Prefabricated horse barns/riding arenas
- General purpose barns
- Hay storage barns
- Feed barns
- Pole buildings
- Shops
- Machinery and equipment sheds
- Prefabricated wood storage sheds
- Small sheds

## PREFABRICATED HORSE BARNs

### SPECIFICATIONS

Structure	6" steel purlins on 6' centers; enamel exterior
Foundation	Concrete piers
Floor	Dirt
Door	Sliding stall (inside tract)
Roof	2" x 12" pitch; skylight in each stall
Roofing	White 26 gauge steel hi-rib
Walls	Laminated wall panels; grilled fronts; top 4'; 5" colored gutter trim

### IN LINE SHED ROW BARN

Stall Size	First Stall	Each Additional Stall
12' x 12'	\$2,800	\$2,400
12' x 16'	3,350	2,900

Shed roof overhang per square foot:   8' — \$4.55  
   12' — \$5.15

### GABLE ROOF BARN—STANDARD BREEZEWAY

Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	\$7,250	\$6,150
12' x 12' with 16' breezeway	7,650	6,400
12' x 16' with 12' breezeway	8,400	7,300
12' x 16' with 16' breezeway	8,900	7,700

### GABLE ROOF BARN—RAISED BREEZEWAY

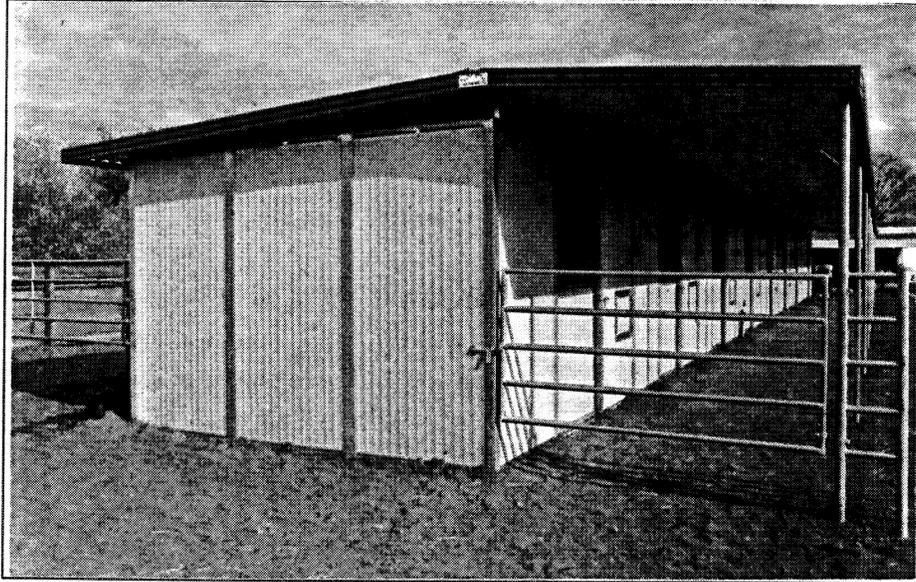
Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	\$8,000	\$6,900
12' x 12' with 16' breezeway	8,700	7,500
12' x 16' with 12' breezeway	9,400	8,300
12' x 16' with 16' breezeway	10,200	8,900

Roof extension per square foot—\$5.15  
 12-foot Breezeway Doors—\$700 each  
 16-foot Breezeway Doors—\$800 each

### ADDITIVES

Item	Cost
Concrete floor	\$3.25 per square foot
Full footing	\$9.00 per lineal foot
Portable 5'-4 rail corral panels	\$6.75 - \$7.75 per lineal foot
Portable 5'-5 rail corral panels	\$7.50 - \$8.00 per lineal foot
Portable 6' rail corral panels with metal roof	\$4.75 - \$5.75 per square foot

## PREFABRICATED HORSE BARNS

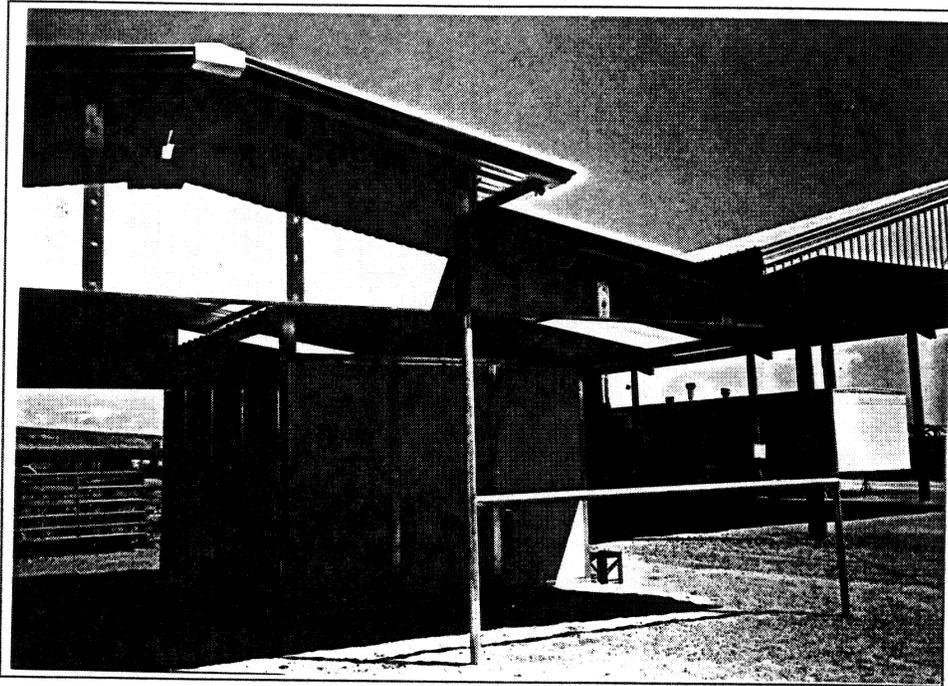


**SHED ROW WITH 8 FOOT ROOF EXTENSION**

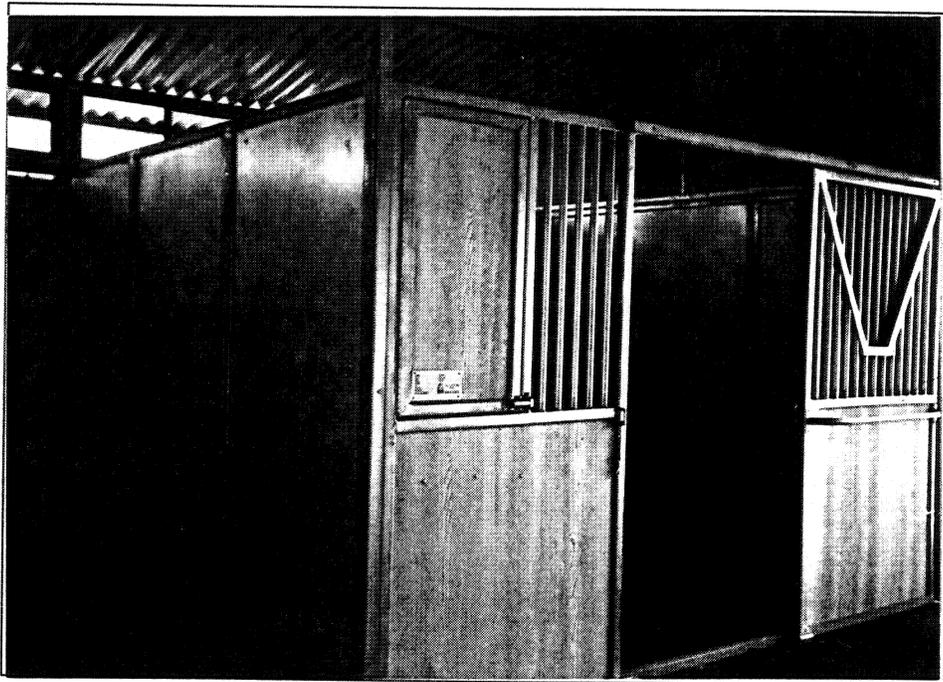


**GABLE ROOF WITH RAISED BREEZEWAY**

## PREFABRICATED HORSE BARN



**GABLE ROOF—RAISED BREEZEWAY WITH ROOF EXTENSION**

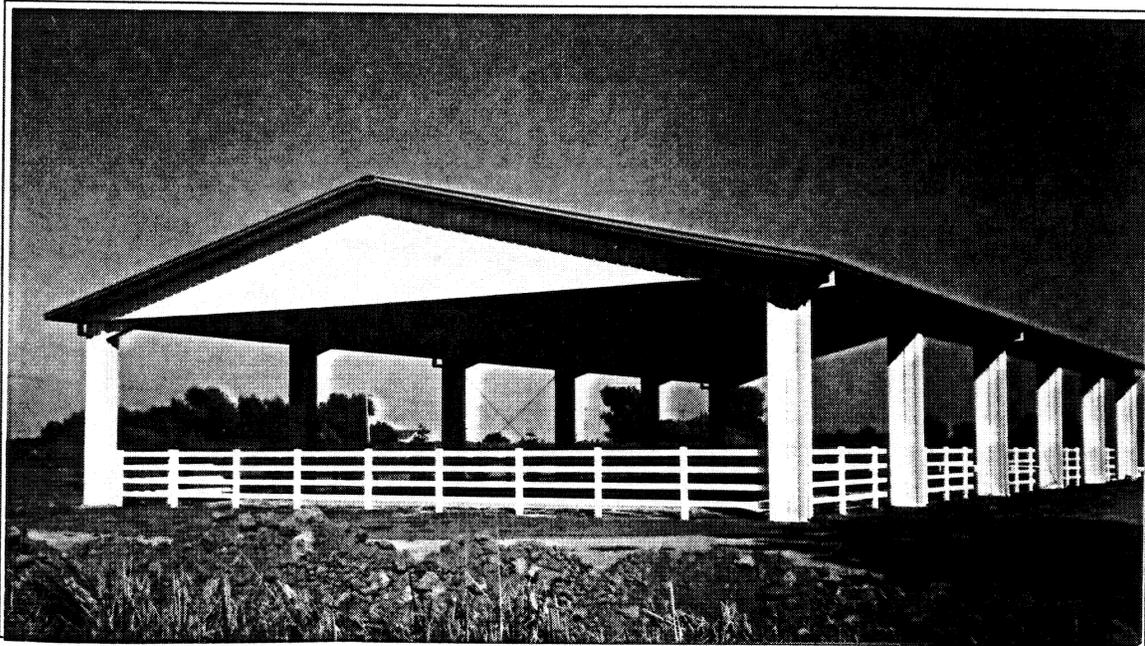


**12' X 12' STALL**

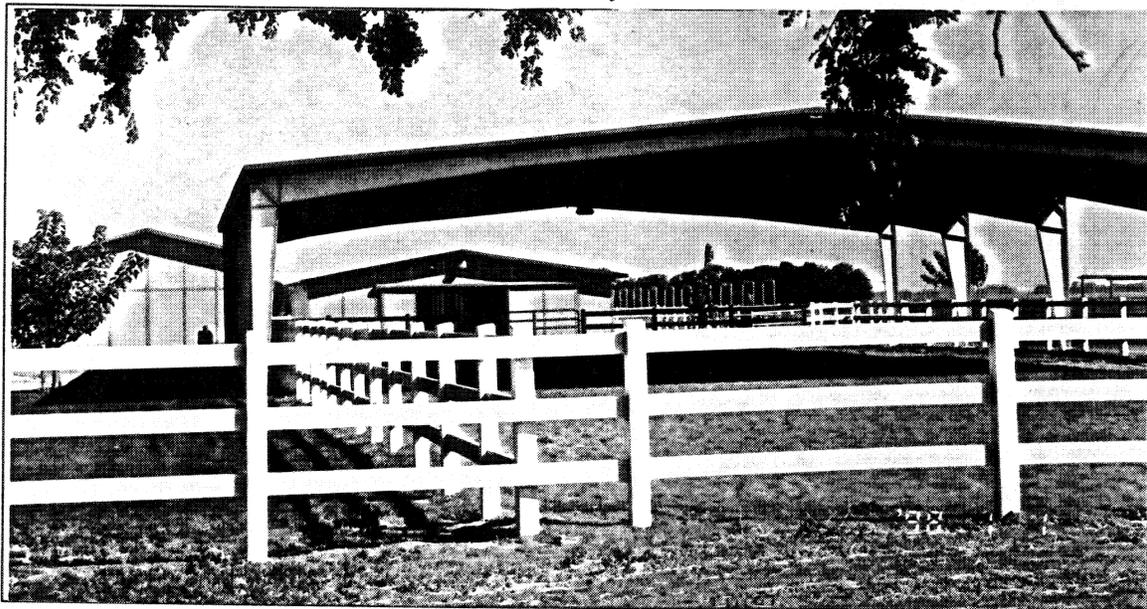
## STEEL FRAME RIDING ARENA

Frame	Good quality steel frame, 14' to 16' eave height
Roof	Gable roof with 26-gauge panels
Walls	None
Floor	Sand
Plumbing	Minimum water outlets
Electrical	None—or add \$.50 per square foot
Cost	<b>\$7.15 to \$7.70 per square foot</b>

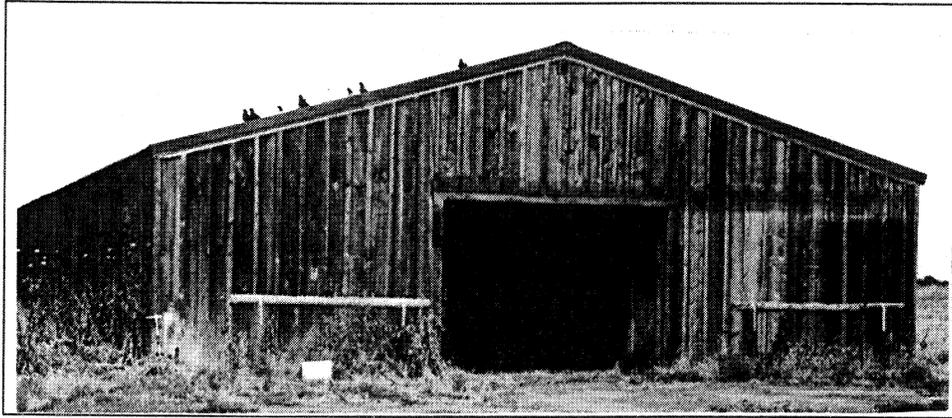
Vinyl Fencing – \$8.70 to \$9.45 per foot



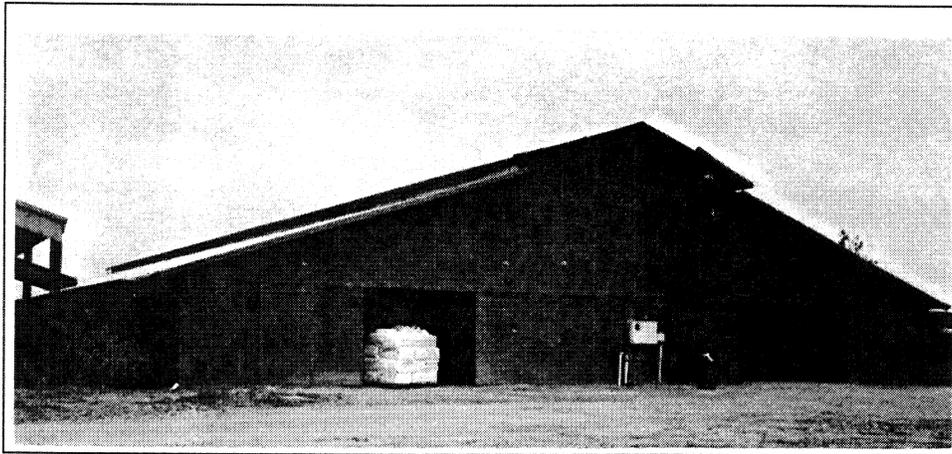
Good Quality Arena



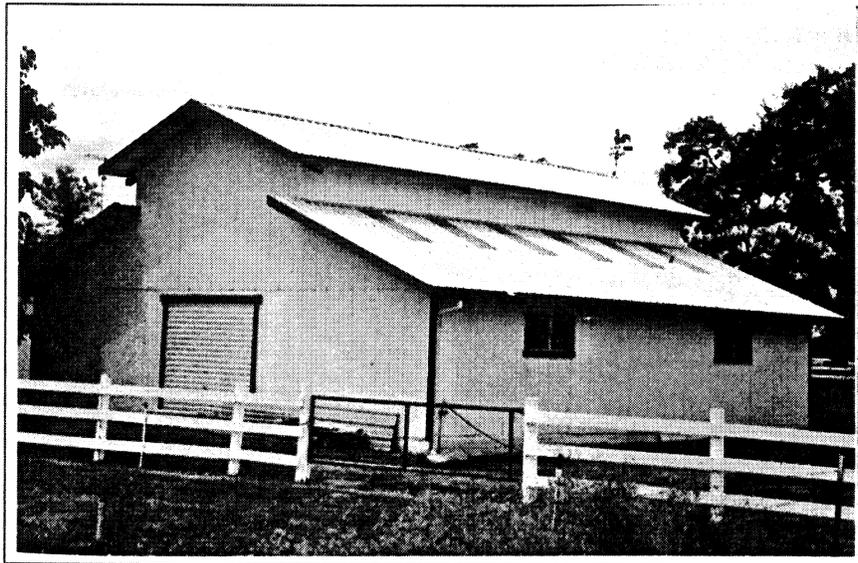
## GENERAL PURPOSE BARN



**FAIR QUALITY**



**AVERAGE QUALITY**



**GOOD QUALITY**

## GENERAL PURPOSE BARNs

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt/some concrete	Concrete
Wall Structure	Light wood frame, 10' eave height	Average wood frame, 10' eave height	Good wood frame, 10' eave height
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

### SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	13.55	10.50	9.75	9.36	9.00	8.80
2	17.40	14.20	13.20	12.70	12.40	12.00
3	26.68	21.86	20.22	19.47	19.00	18.57

## HAY STORAGE BARNs

### BUILDING SPECIFICATIONS

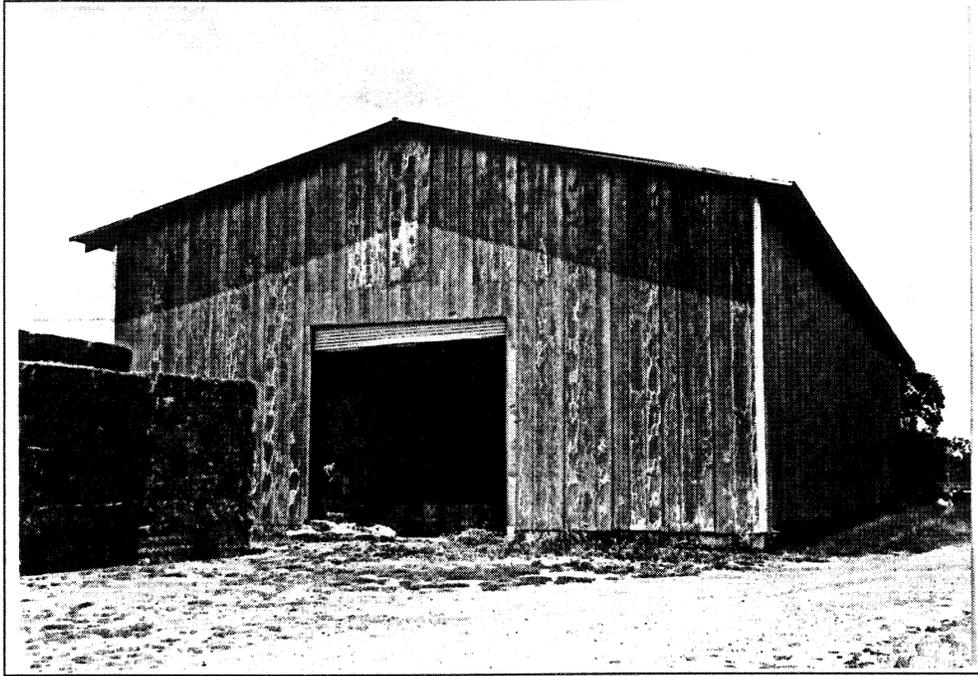
Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt	Concrete
Wall Structure	Light wood frame, 20' eave height	Average wood frame, 20' eave height	Good wood frame, 20' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets
Shape	Nearly square, length between one and two times width	Nearly square, length between one and two times width	Nearly square, length between one and two times width

### SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
<b>1</b>	11.41	9.51	8.59	8.01	7.66	7.30
<b>2</b>	13.05	10.84	9.86	9.17	8.70	8.40
<b>3</b>	21.29	17.73	15.94	14.94	14.26	13.71

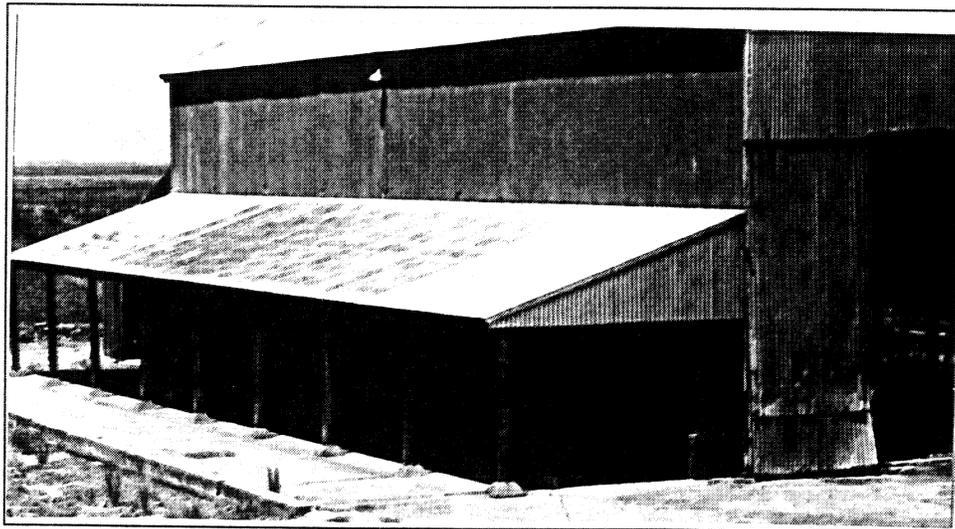
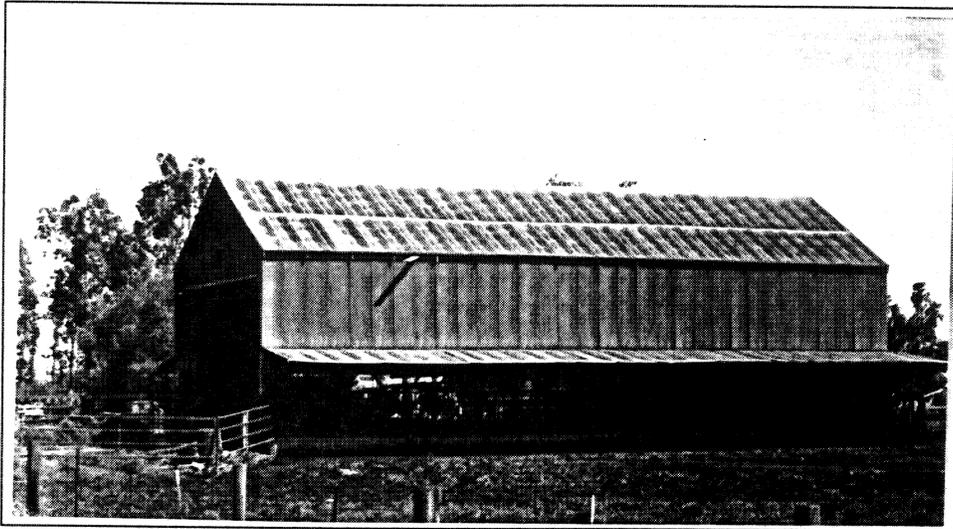
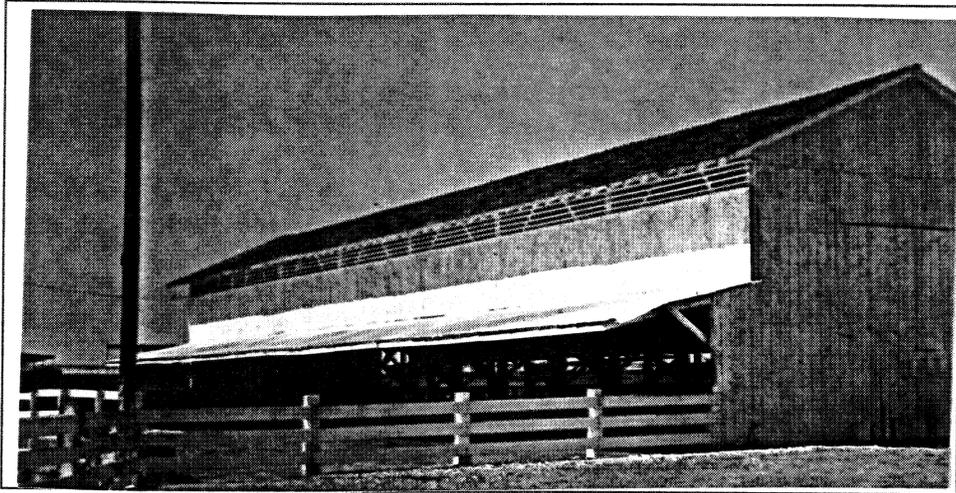
**Adjustments:** Pole Buildings – Deduct 10% from above costs  
 No Electricity/No Water – Deduct \$.75 to \$1.00 per square foot

## HAY STORAGE BARN



**AVERAGE-QUALITY HAY STORAGE BARN**

# FEED BARN



## FEED BARNs

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete in center section	Concrete
Wall Structure	Light wood frame, 8' eave height at drip line	Average wood frame, 8' eave height at drip line	Good wood frame, 8' eave height at drip line
Exterior Wall Cover	Open sides and ends	Open sides, standard gauge corrugated iron, aluminum, or average wood siding on ends	Open sides, good siding painted on ends
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to low pitch—average wood trusses	Medium to low pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; 26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

### SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	7.28	6.71	6.43	6.33	6.25	6.19
2	11.49	10.57	10.18	10.05	9.93	9.89
3	13.37	12.28	11.95	11.76	11.65	11.60

## POLE BUILDINGS

### BUILDING SPECIFICATIONS

Structure	Poles: 15' to 20' on center; wood or steel
Floor	Dirt
Roof	Light trusses; low to medium pitch; wood or steel
Roofing	Galvanized steel or colored steel with gutter
Walls	None, wall height: 18' - 21' to plate

### SQUARE-FOOT COSTS

### ALL SIDES OPEN

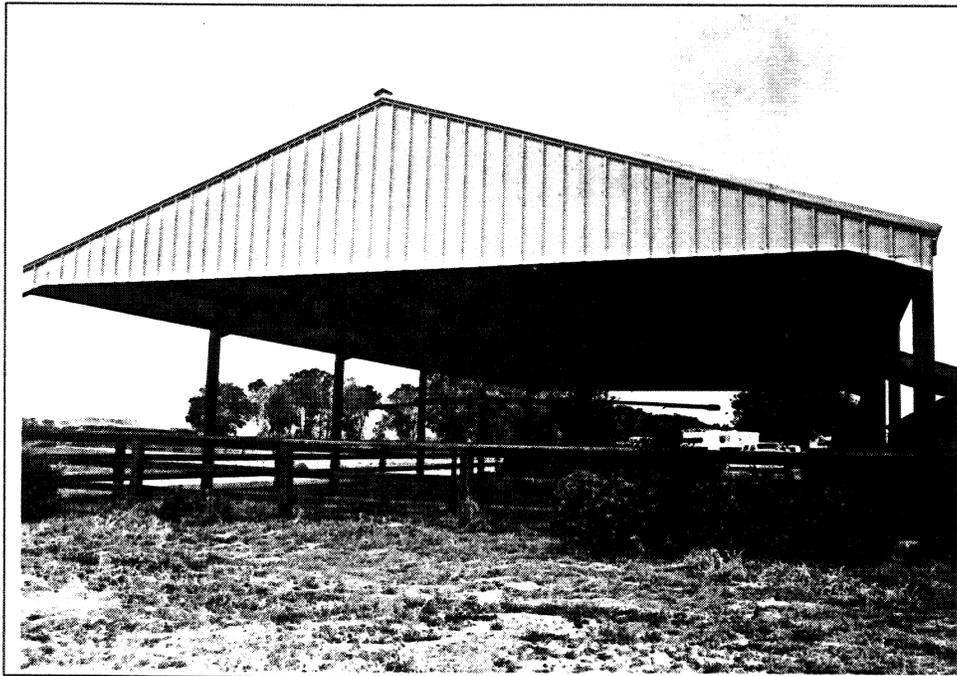
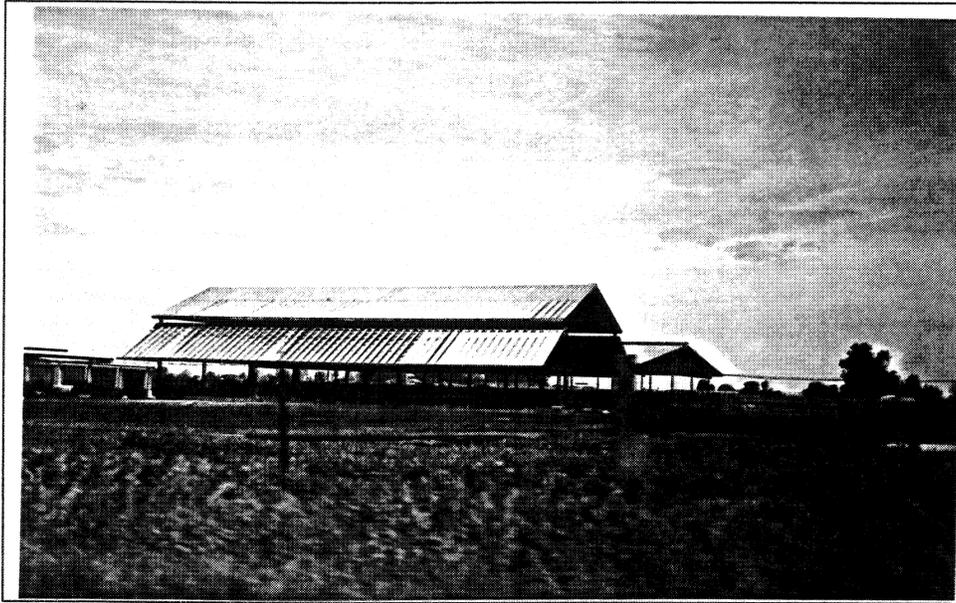
### GOOD QUALITY

End Width	Side Length									
	30	50	80	100	120	140	150	160	180	200
20	6.64	6.32	6.16	6.00	5.89	5.78	5.73	5.68	5.63	5.63
30	6.05	5.89	5.73	5.57	5.47	5.36	5.30	5.25	5.19	5.14
40	5.68	5.52	5.36	5.19	5.03	4.92	4.87	4.87	4.87	4.87
50	5.36	5.19	5.03	4.87	4.71	4.66	4.66	4.66	4.66	4.66
60	5.09	4.93	4.71	4.66	4.66	4.66	4.66	4.66	4.66	4.66
70	5.09	4.87	4.71	4.66	4.66	4.61	4.61	4.61	4.61	4.61
80	5.09	4.87	4.71	4.66	4.66	4.61	4.61	4.61	4.61	4.61

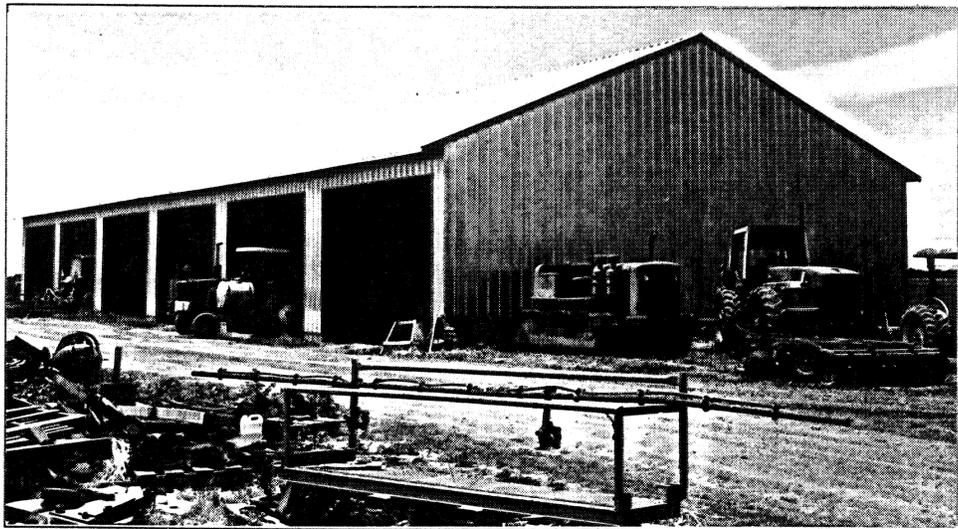
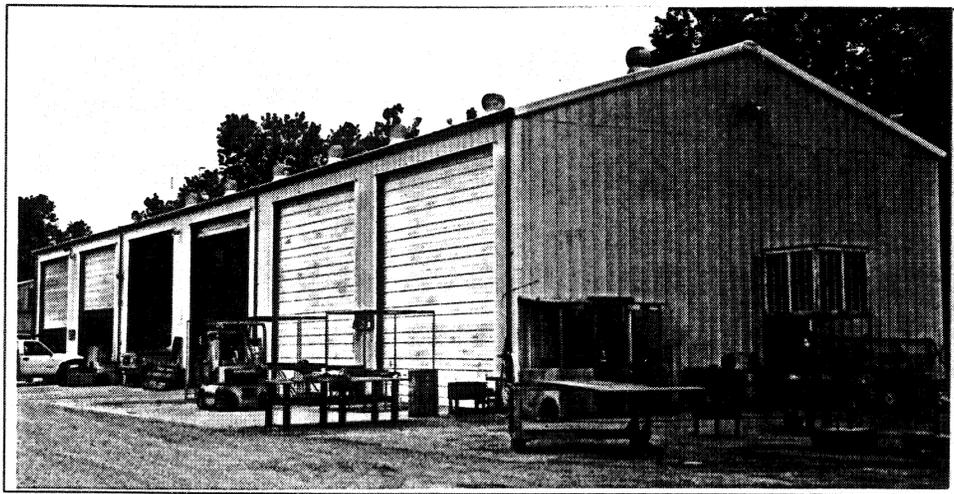
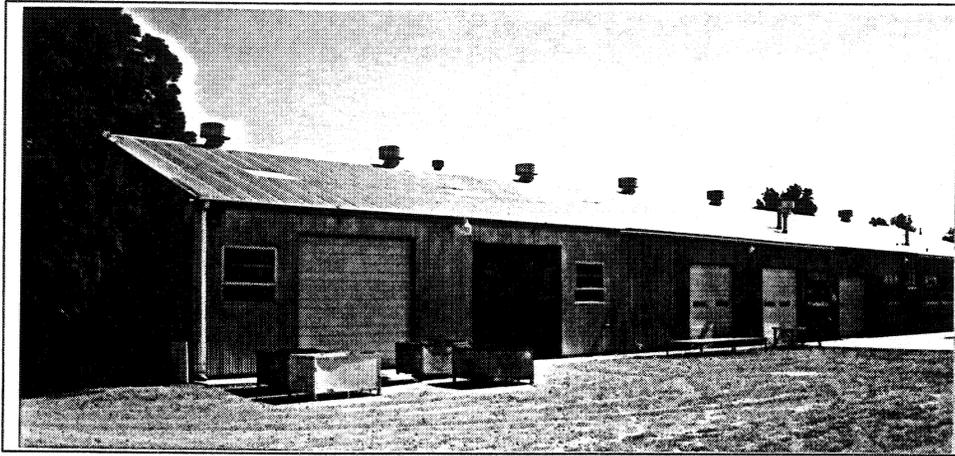
Deduct 15 percent for light duty, fair quality construction.

Skylights (2' x 10')	<b>\$100.00</b> each
Vents (14", Rotary)	<b>\$200.00</b> each
Poles, In-Place	<b>\$85.00</b> each
Covered wall area add	<b>\$3.50</b> per square foot of wall surface
Reinforced Concrete Floors:	
4"	<b>\$2.50</b> per square foot
6"	<b>\$3.25</b> per square foot

# POLE BUILDING



# SHOPS



## AVERAGE QUALITY SHOPS

# SHOPS

## BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Light concrete	Light concrete	Standard concrete
Floor	3" concrete	4" concrete	4" reinforced concrete
Wall Structure	Light wood frame, 15' eave height	Average wood frame, 15' eave height	Good wood frame, insulated, 15' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron, aluminum, or average wood siding	Good wood siding painted or 26-gauge steel
Roof Construction	Low to medium pitch— 2" x 4" rafters, 24" to 36" on center, or light wood trusses	Low to medium pitch— average wood trusses	Medium pitch— good wood trusses, insulated roof
Roof Cover	Light aluminum corrugated	Standard gauge corrugated iron or aluminum	26-gauge steel, with skylights
Electrical	Two outlets per 1,000 square feet	Two outlets per 1,000 square feet	Excellent lighting and ample outlets
Plumbing	None	One cold water outlet	Two cold water outlets
Doors	One light sliding or swinging door per 2,000 square feet	One average sliding or swinging door per 2,000 square feet	One drive-thru door per 1,000 square feet plus one walk-thru door
Windows	None	None or few low cost	5 percent of floor area
Shape	Nearly square, length between one to three times width	Nearly square, length between one to three times width	Nearly square, length between one to three times width

## SQUARE-FOOT COSTS

Class	Square-Foot Area									
	1,000	1,500	2,000	2,500	3,000	4,000	5,000	6,000	8,000	10,000
1	14.81	13.61	12.75	12.12	11.55	11.25	10.91	10.62	10.33	10.05
2	18.60	17.17	15.96	15.38	14.81	14.19	13.63	13.32	13.05	12.75
3	21.45	21.45	20.27	19.43	18.58	17.97	17.40	16.84	16.24	15.66

# MACHINERY AND EQUIPMENT SHEDS

## BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete	Concrete
Wall Structure	Light wood frame, 10' to 12' eave height	Average wood frame, 10' to 12' eave height	Good wood frame, 10' to 12' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel, with skylights
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Shape	Usually elongated, width between 20 and 40 feet, any length	Usually elongated, width between 20 and 40 feet, any length	Usually elongated, width between 20 and 40 feet, any length

## SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

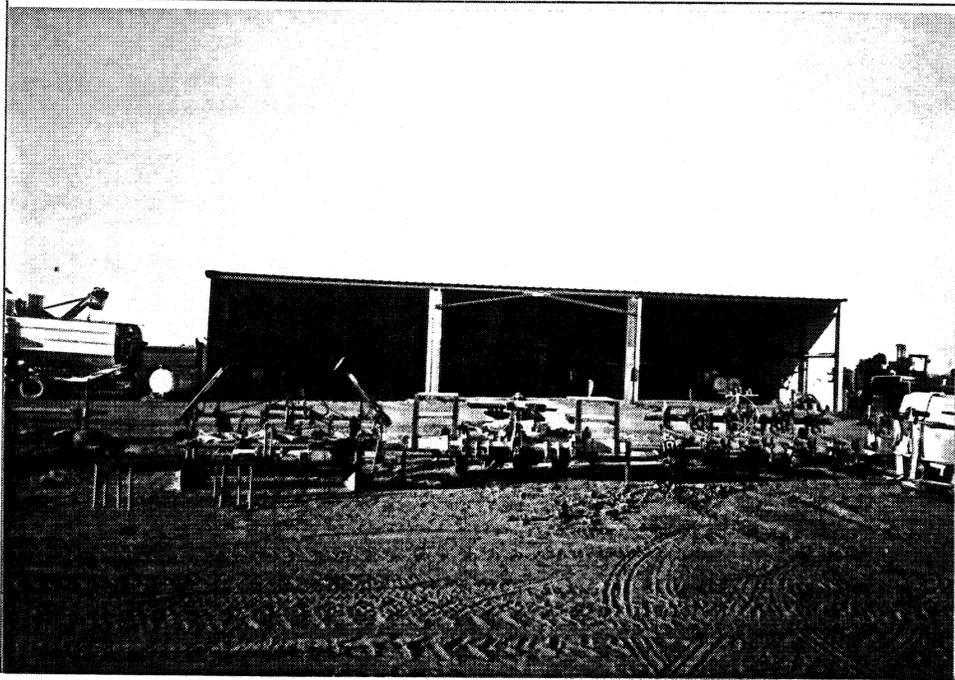
Class	Square-Foot Area										
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	9.55	8.58	7.98	7.70	7.82	7.46	7.39	7.29	7.22	7.14	7.10
2	14.01	12.23	11.65	13.37	11.12	10.85	10.77	10.72	10.65	10.60	10.55
3	18.15	16.37	15.24	14.95	14.61	14.44	14.26	14.15	14.05	13.94	13.87

## SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

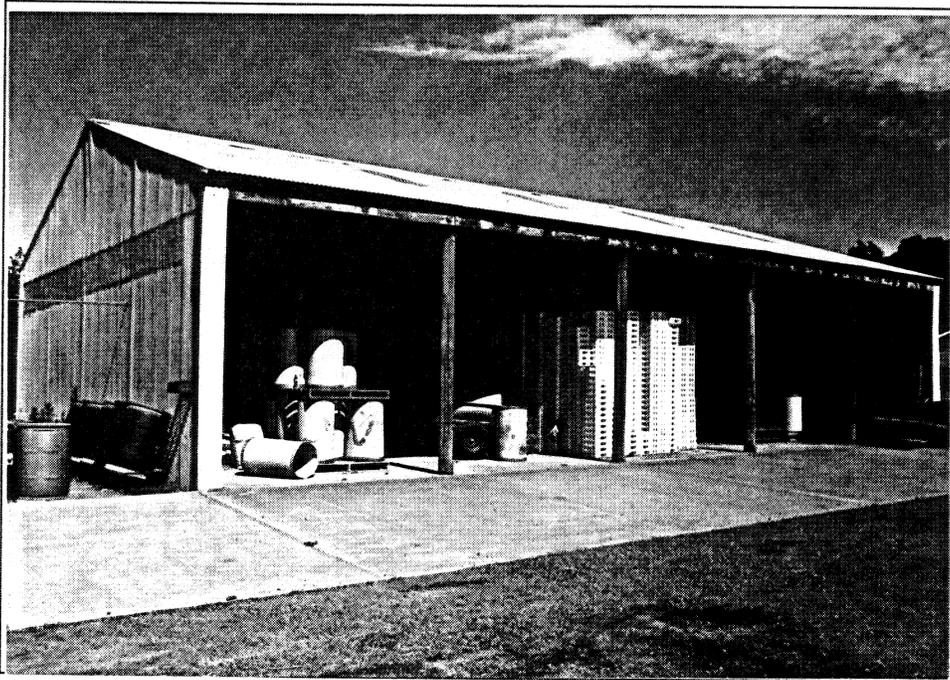
Class	Square-Foot Area										
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	8.38	7.04	6.61	6.39	6.27	6.20	6.14	6.08	6.03	5.97	5.92
2	12.81	11.01	10.16	9.85	9.56	9.49	9.33	9.27	9.22	9.12	9.05
3	14.83	14.33	13.47	12.91	12.56	12.39	12.29	12.16	12.11	12.04	11.99

Pole Buildings – Deduct 10% from above costs.

# MACHINERY AND EQUIPMENT SHEDS

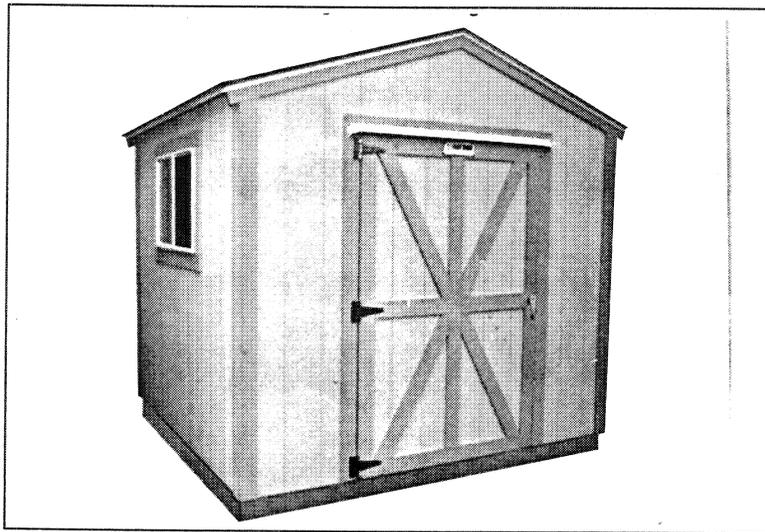
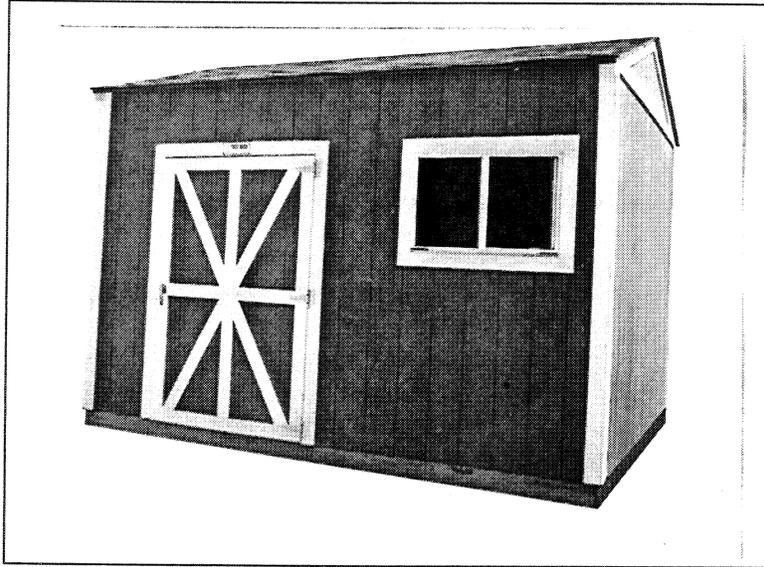


**FAIR-QUALITY EQUIPMENT SHED**



**AVERAGE-QUALITY EQUIPMENT SHED**

## PREFABRICATED WOOD STORAGE SHEDS



**AVERAGE QUALITY**

## PREFABRICATED WOOD STORAGE SHEDS

Prefabricated wood storage sheds are normally purchased at lumber yards and home improvement centers.

### BUILDING SPECIFICATIONS

Foundation	4" x 4" pressure treated skids
Floor	Plywood or particleboard on 2" x 6" floor joists
Walls Structure	2" x 4" framing on 24" centers, 6 ½' to 7 ½' eave height
Exterior Wall Cover	Plywood or T-1-11 with one 4' x 6' door
Roof	Gable low to medium pitch, 2" x 4" rafters
Roof Cover	Metal or composition shingles

### SQUARE-FOOT COSTS

Square Feet	Price Per Square Foot
50 to 74	\$19.00
75 to 99	\$16.40
100 to 139	\$15.25
140 to 199	\$14.20
200 and up	\$11.60 - \$13.25

### ADDITIVES

Windows	2' x 2'	<b>\$60</b>
	3' x 2'	<b>\$75</b>
Doors—Double 6' Wide		<b>\$70</b>
Skylight—2' x 2'		<b>\$115</b>
Turbine Vent		<b>\$65</b>
Shelves—16" wide		<b>\$3.25</b> per linear foot
Shelves—24" wide		<b>\$3.75</b> per linear foot
Workbench—24" wide		<b>\$4.50</b> per linear foot
Steel roll-up door		<b>\$55</b> per foot (width)
Loft		<b>\$3.25</b> per square foot

## SMALL SHEDS

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Boards	Concrete
Wall Structure	Light wood frame, 8' eave height	Average wood frame, 8' eave height	Good wood frame, 8' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum, or average framing	Good wood siding, painted, or steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Wood shingles; good steel cover; composition shingles
Electrical	None	None	None
Shape	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length

### SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

Class	Square-Foot Area										
	50	60	80	100	120	150	200	250	300	400	500
1	13.03	11.79	10.55	9.01	8.65	8.09	7.78	7.47	7.93	6.85	6.49
2	18.28	16.43	14.88	13.70	13.03	12.41	11.85	11.23	10.56	10.25	9.94
3	23.07	20.65	19.21	18.02	16.74	15.50	14.57	14.01	13.34	13.03	12.72

### SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

Class	Square-Foot Area										
	50	60	80	100	120	150	200	250	300	400	500
1	9.27	8.65	8.09	7.47	6.80	6.49	6.03	5.67	5.41	5.05	4.89
2	13.70	12.72	11.79	11.12	10.56	9.94	9.27	8.65	8.34	8.09	7.98
3	17.15	15.40	14.88	13.96	13.03	12.41	11.90	11.12	10.56	9.94	9.63

## AH 534.20: DAIRY BARNS

This section contains structures and equipment typically used at a dairy. Specifications and costs are provided for the following:

- Commonly used milking parlors
- Rotary barns
- Parallel barns
- Modern Herringbone barns
- Holding, wash, and drip area equipment
- Dairy equipment
- Freestall barn
- Hospital barn
- Corrals
- Commodity barns
- Hay barns
- Miscellaneous equipment
- Septic tanks
- Feedlane stanchions
- Silage pits
- Liquid manure systems
- Feed tanks
- Grade "B" barns
- Stanchion barns
- Walk-through type barns

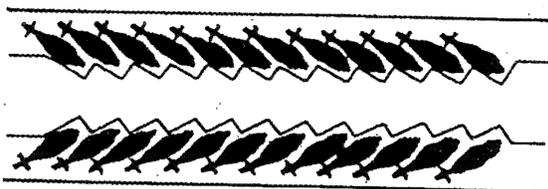
THIS PAGE BLANK

# DAIRY BARNS

## COMMONLY USED MILKING PARLORS

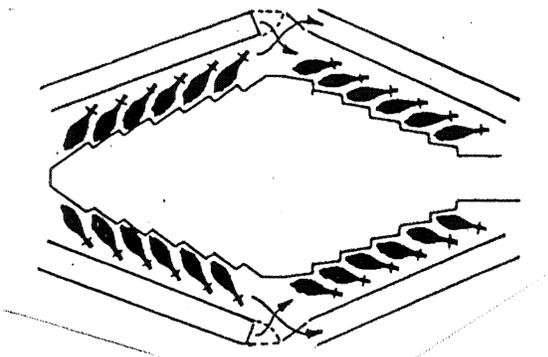
Below are three of the most common styles of milking barns used in California. The most frequently found is the herringbone or sawtooth design. There are several variations of this design. The polygon design is a parlor using multiple sets of herringbone stalls. The parallel design is gaining popularity, especially in larger parlors. The mentioned parlors all have a central pit for the milker, with cows elevated on one or all sides. The following details show basic differences of each design.

### HERRINGBONE (DOUBLE 12)



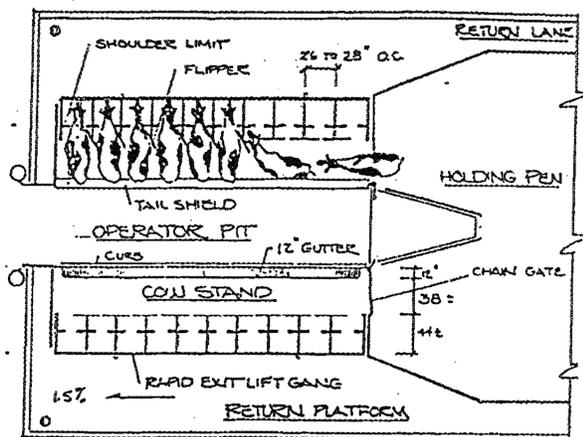
All cows on either side of the pit enter and leave as a group. Newer parlors may have 20 to 30 cows to a side. Some have rapid exit group side release.

### POLYGON



Each of the four sides has separate group entry and exit. Usually each side is a herringbone configuration, but can have angle modifications.

### PARALLEL (DOUBLE 10)

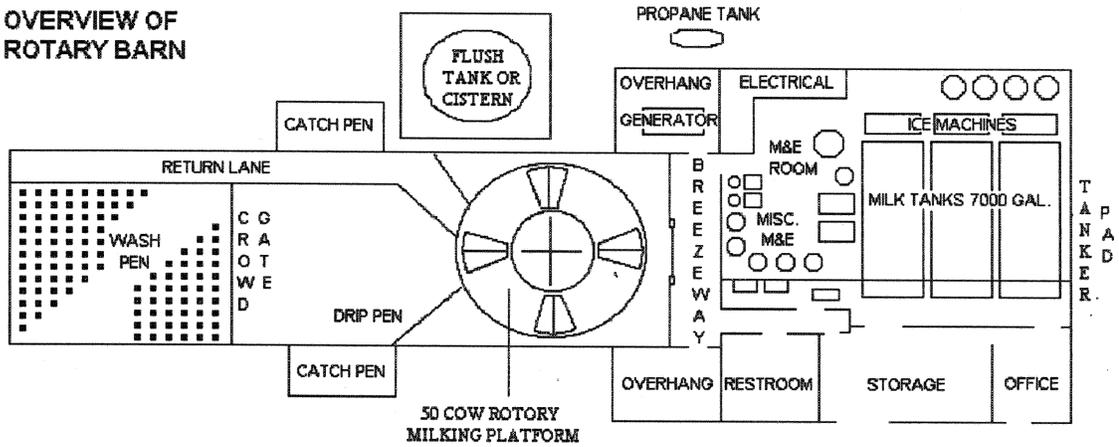


In this design, cows are milked from the rear, rather than the side. Thus, more cows can be milked in a given space than with other designs. Usually a rapid gang exit is present. Typical size is a double 20' to 30'.

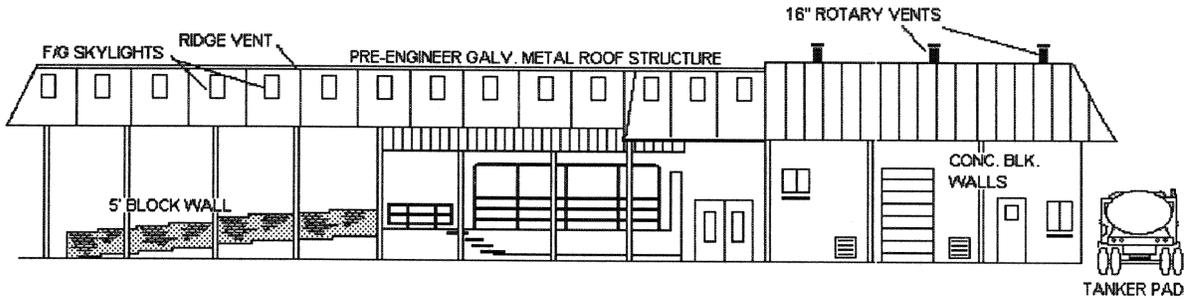
# DAIRY BARNS

## 50-COW ROTARY BARN

OVERVIEW OF ROTARY BARN

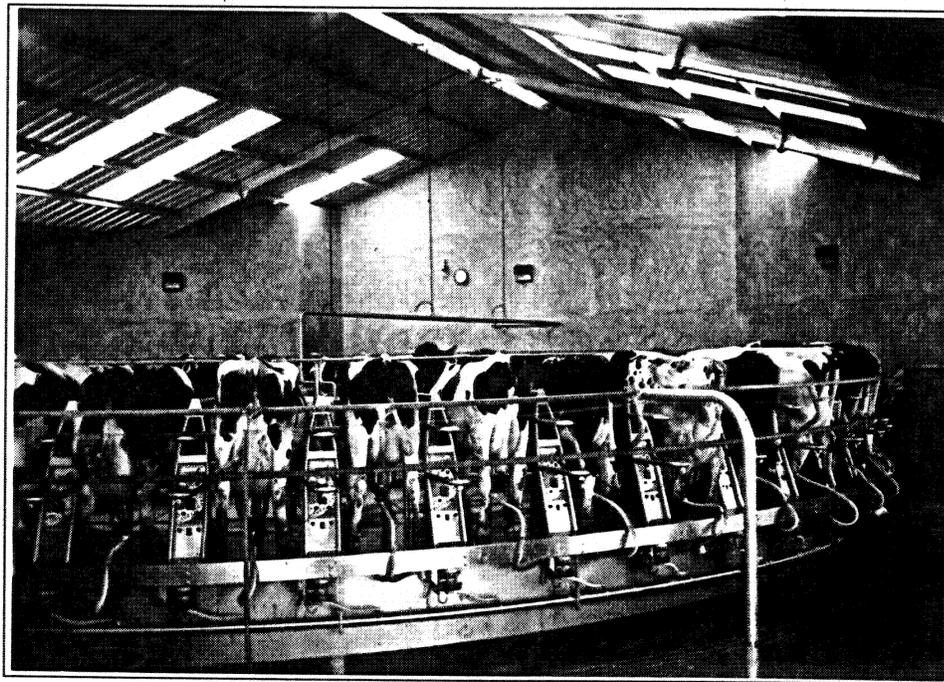
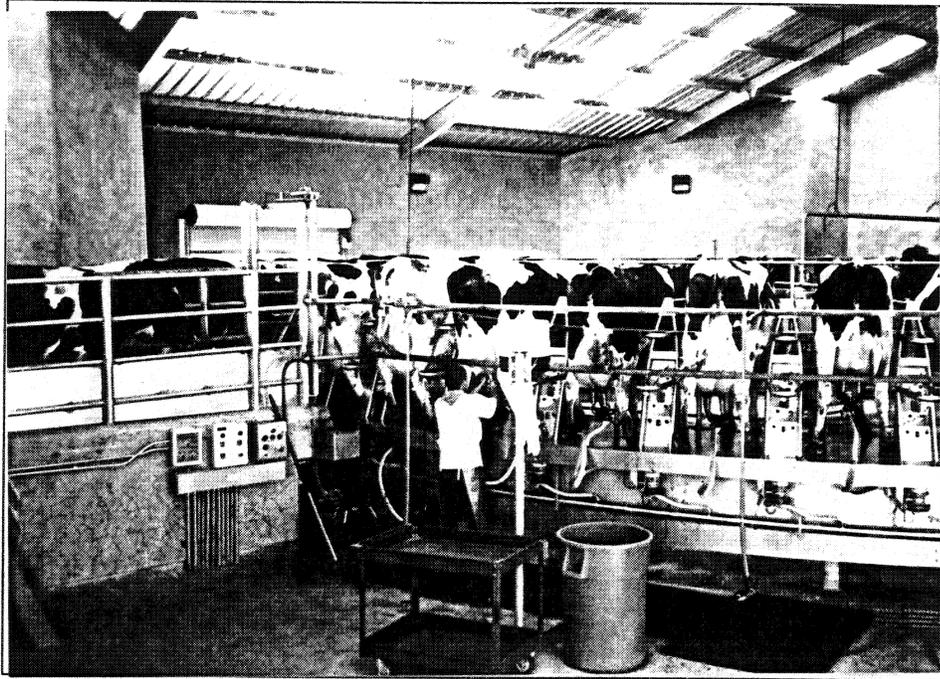


SIDE VIEW



# DAIRY BARNS

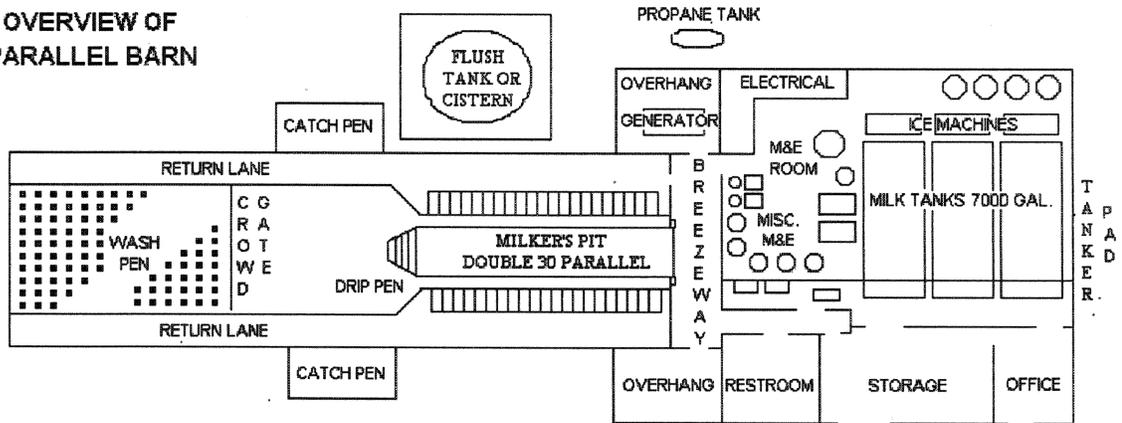
## 50-COW ROTARY MILKING PARLOR



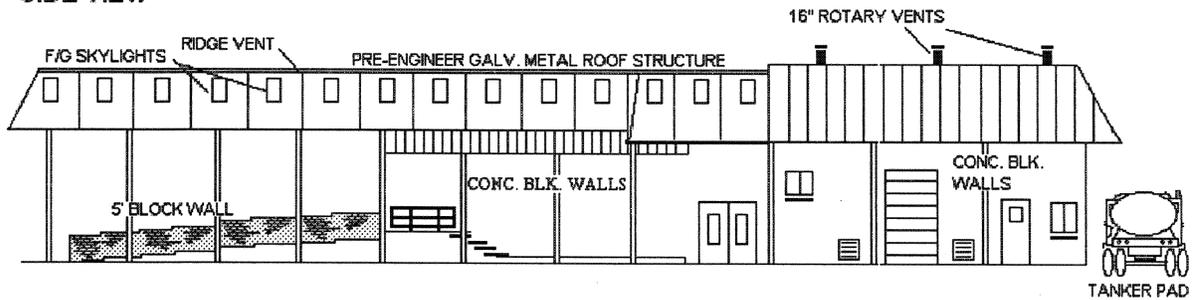
# DAIRY BARN

## DOUBLE 30 PARALLEL BARN

OVERVIEW OF PARALLEL BARN



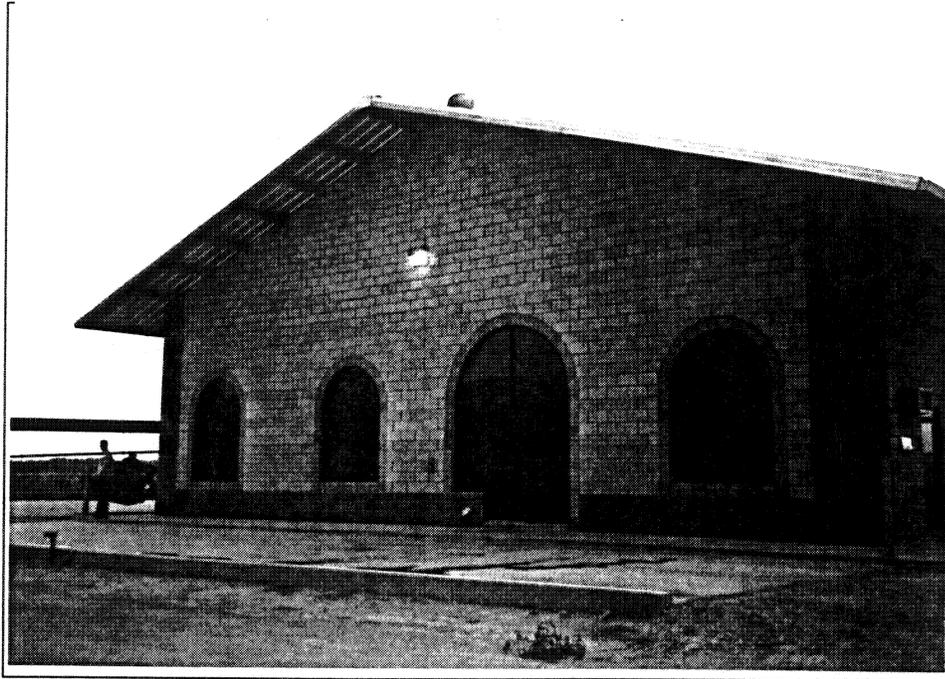
SIDE VIEW



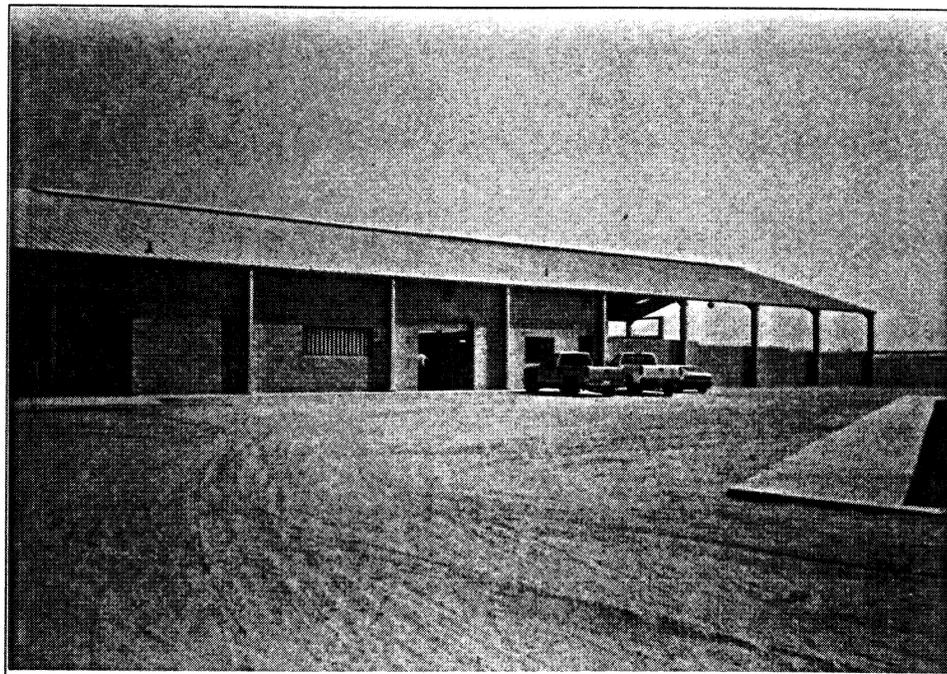
# DAIRY BARNS

EXTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY

AVERAGE QUALITY



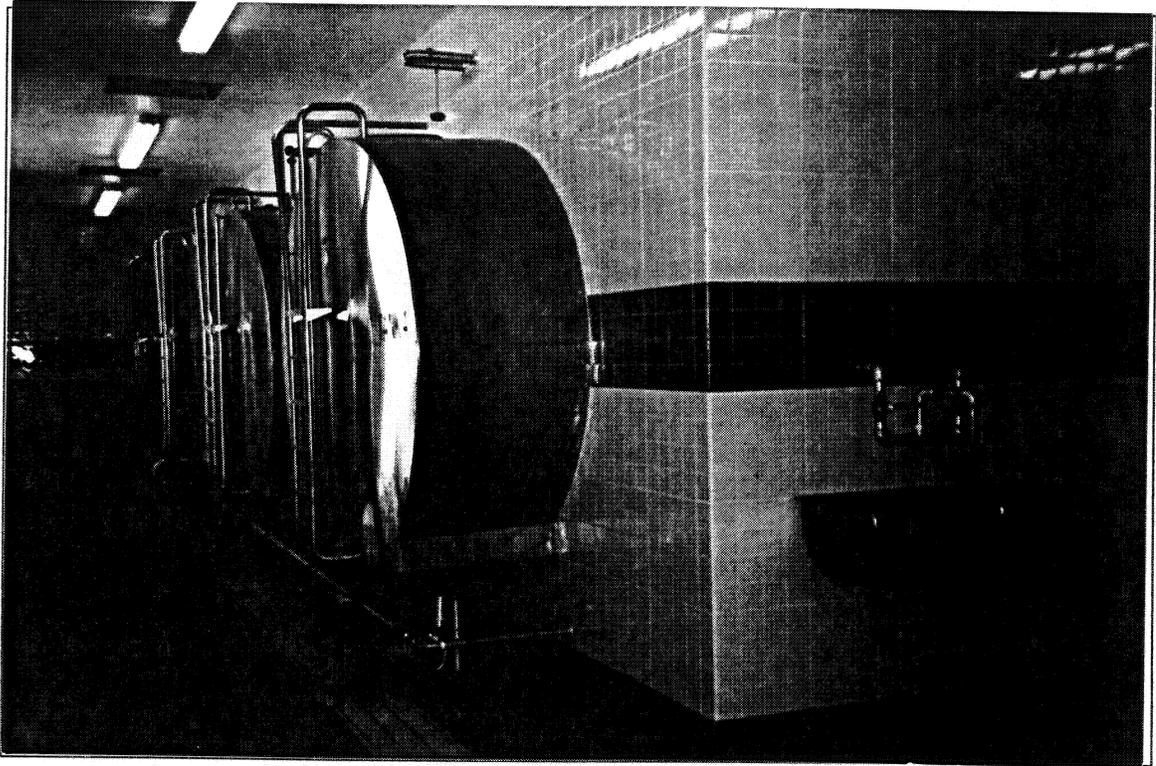
Equipment, office, milk room



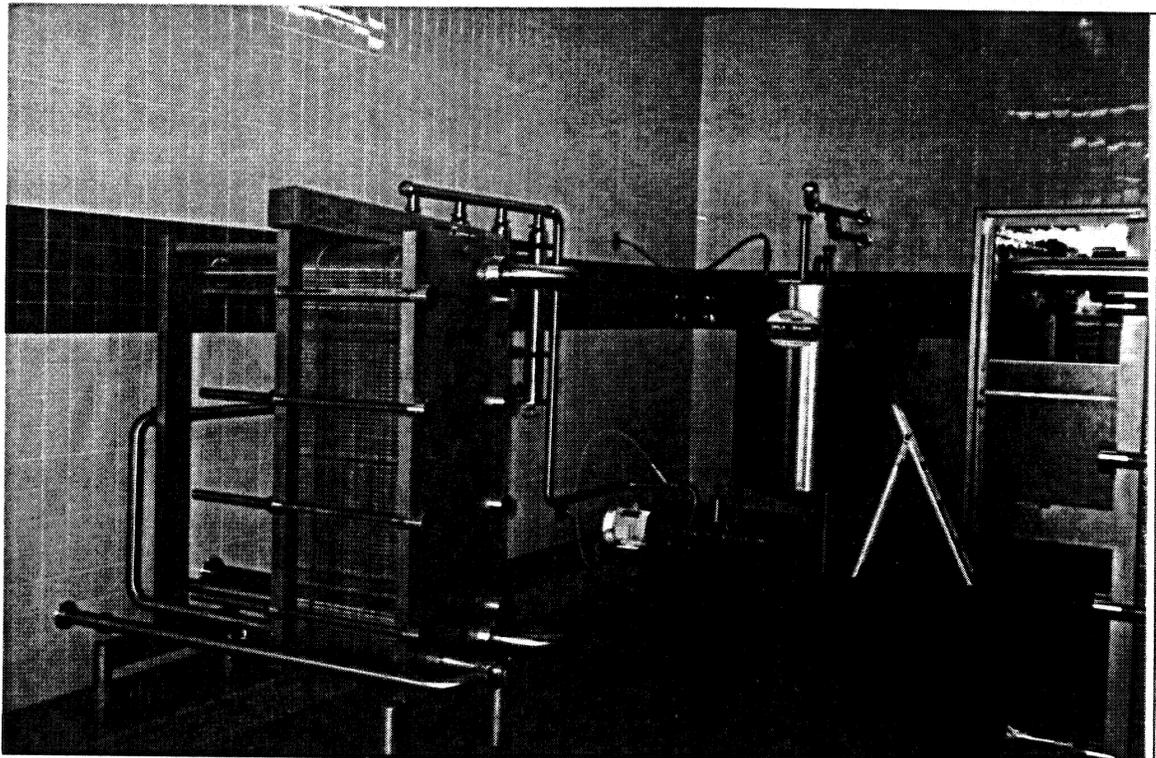
Milking parlor and wash area

# DAIRY BARNS

## INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY

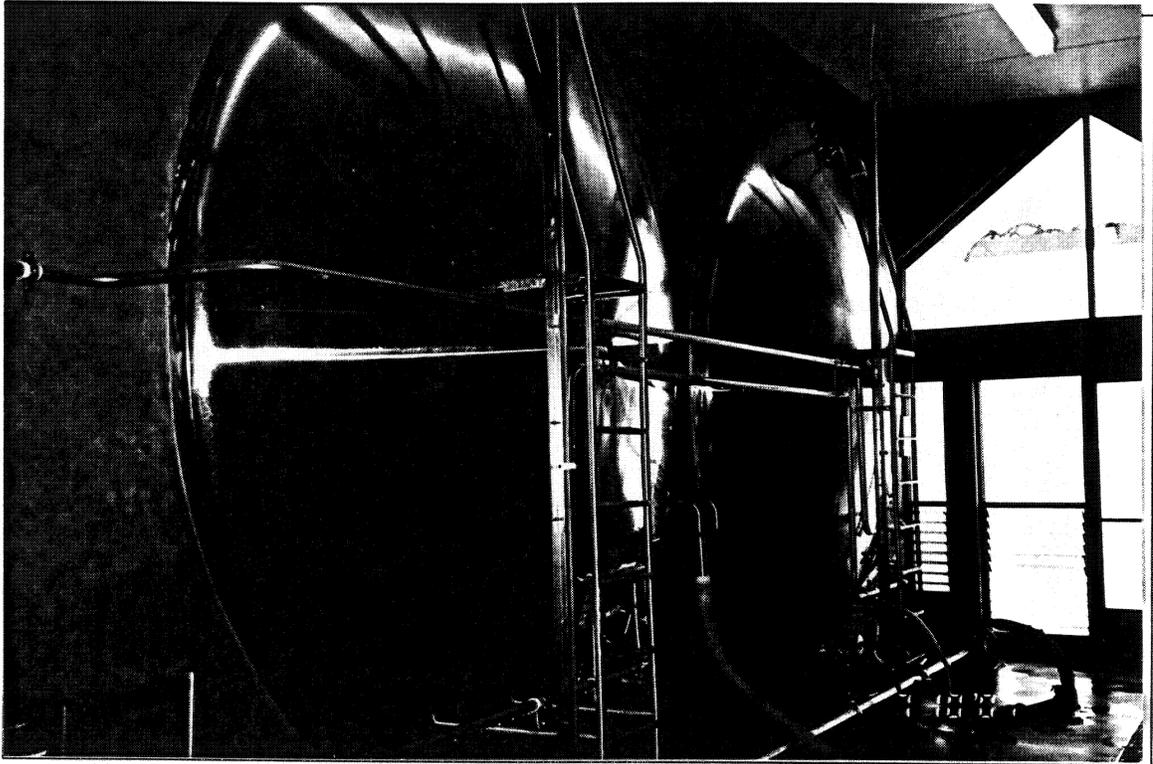


Milk room – good quality

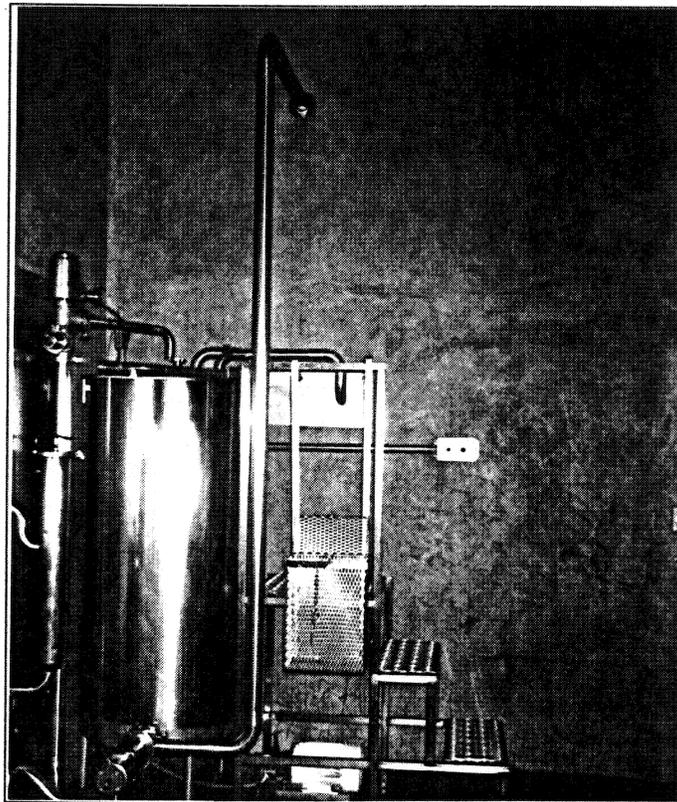


# DAIRY BARNS

## INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY



Milk room – average quality



## DAIRY BARNS

### MODERN HERRINGBONE, PARALLEL, OR ROTARY

High end of the range in cost is for Sacramento and Northern California

Major electrical to run milking equipment—mains and subpanels, breakers and master start switches—are considered fixtures and are not included in building costs.

#### EQUIPMENT ROOM, OFFICE, BREEZEWAY, MILK ROOM, RESTROOM, BATH

Components	Average Quality	Good Quality
Foundation	Reinforced concrete	Reinforced concrete
Floors	Concrete slab	Concrete slab, reinforced
Walls	8" concrete block	Concrete block
Exterior	Stucco or concrete block	Stucco and masonry veneer, split face
Roof Structure and Roofing	Average wood frame, corrugated iron roofing	Good wood frame, good quality roofing or steel beams and good steel roofing or tile, skylights, gutters
Windows	Metal sash 10 percent of wall area	Metal sash 10 percent of wall area
Interior	Smooth finish plaster—cove base	Tile
Electrical	Conduit—average fixtures	Conduit—excellent lighting and ample outlets
Plumbing	One stainless steel sink, one water heater, one lavatory, one water closet, usual floor drains	One stainless steel sink, one water heater, ¾ bath, vinyl floor and tape textured walls, usual floor drains
<b>Square-Foot Cost</b>	<b>\$40.00 to \$43.50 per square foot</b>	<b>\$43.50 to \$49.50 per square foot</b>

#### MILKING PARLOR

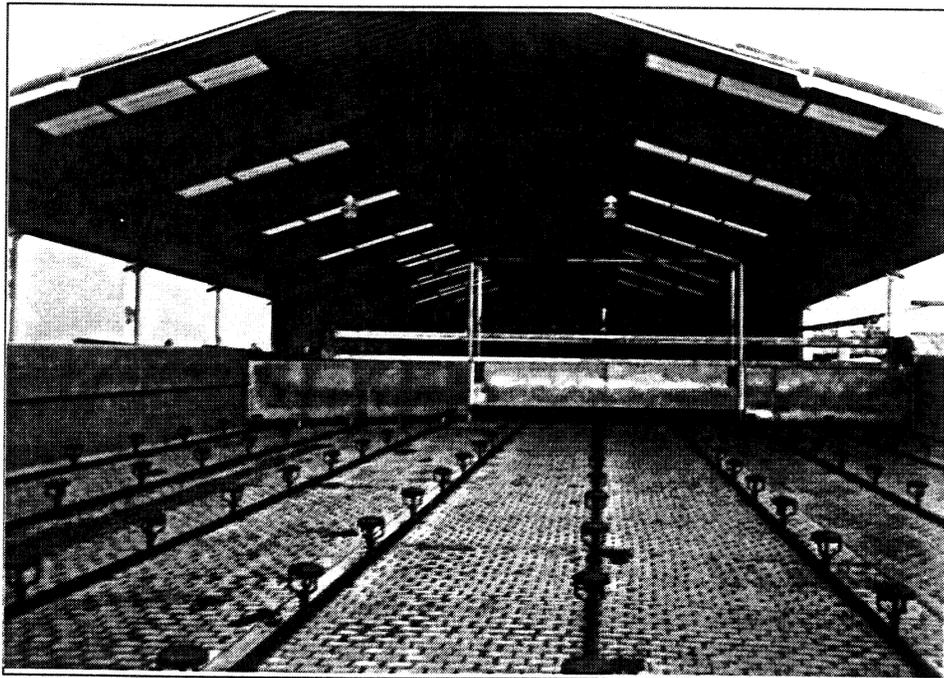
Foundation	6" reinforced concrete
Floors	Concrete slab—well-formed gutters and mangers
Walls	6" or 8" concrete block or reinforced concrete 60" high with 2" x 6"—16" on center framing above, or all concrete block
Roof Structure and Roofing	Average wood frame, corrugated iron roofing or steel beams, good steel roofing, skylights
Windows	Metal sash or metal louvers
Interior	Smooth plaster on entire surface of block walls or some combination of tile and plaster of good quality
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
<b>Square-Foot Cost</b>	<b>Without gates and feeding equipment—\$24.50 to \$29.00 per square foot</b>

**TOTAL BUILDING COST:** includes equipment room, milk room, office, bath, supply, milking parlor, and wash and drip area—Average quality **\$27.00 to \$29.00**  
 Good quality **\$29.00 to \$34.00**

## DAIRY BARNS

### HOLDING, WASH, AND DRIP AREA EQUIPMENT

Floor or Ramp	Sloping concrete with carborundum finish. \$2.75 - \$3.00 per square foot
Walls	Concrete block 5' to 6' high with smooth plaster. \$38.00 to \$42.00 per lineal foot
Metal Rail Fence	Welded pipe 7'—10' o.c. in concrete. \$8.50 - \$10.00 per lineal foot
Cable Fence	1 1/4" top rail, 2 7/8" post, 7' o.c. 3 cable—\$7.00 per lineal foot 4 cable—\$7.50 per lineal foot
Gates	54" high, pipe with bracing. \$14 per lineal foot of gate width
Sprinkler System	Hooded Rainbird, including pump. \$125-\$150 per Rainbird, or per double 30 barn—60 cows \$16,000 - \$17,000
Roof Structure and Roofing	Average quality: Pipe supports, wood or light steel frame and corrugated iron roofing—\$4.30 to \$5.80 per square foot Good quality: Box beam columns, hot-dip galvanized and box beam galvanized rafters and purlins; quality steel roofing with skylights—\$6.00 to \$7.00 per square foot
Total Area Cost Including All Components	\$15.50 - \$17.30 per square foot



Wash Pen

## DAIRY BARNS

### DAIRY EQUIPMENT

#### PARALLEL STALLS (DOUBLE 30)

2' x 30' parallel stall package includes galvanized reels, reel support post, sequencing panels, galvanized rump rail assembly, kick bar support, entrance gate, and hardware. 2' x 30' parallel drive kit includes air controls, air tubing, rump panels, drive guards, air cylinders, hardware, stainless steel curbing, and top rail. Air operated catch lane gates include air control ram, hardware to mount, step ladders with hand rails (front), and miscellaneous hardware.	\$82,000
--	----------

#### VACUUM PUMP

Air vacuum pump with 30 H.P. motor, stand, pulleys, belts, guards, filter assembly, miscellaneous pipe valves, and electrical.	\$9,700
--	---------

#### PIPELINE AND EQUIPMENT

Claws with pulsators and pulsator controller, master control panel, 2 H.P. milk pump, milk receiver, jetter assembly and hose, fresh air kit, C.I.P. sink. Also includes all stainless steel pipelines, elbows, valves, all PVC lines, electrical wiring and panels, and miscellaneous hardware.	\$82,000
--	----------

#### MILK TRANSFER SYSTEM

Control assembly and miscellaneous equipment.	\$4,200
---	---------

#### DETACHERS

Air operated retraction with both manual and automatic operation, indicator lights indicating milking mode and milk flow, air operated shutoff valve/sensor combination, all related electric wiring, air filter, and hardware.	\$70,500
---	----------

#### MILK TANKS (7,000 GALLON)

2 stainless steel 7,000-gallon tanks with agitators and wash pumps. Includes control panel, calibration gauge, temperature recorder with probe assembly, hot milk alarm, miscellaneous piping, and electrical.	\$99,000
--	----------

#### REFRIGERATION SYSTEM

Freon compressor, air condensers, related hardware, pipes, valves, and electrical. Plate cooler with 100 plates and all hardware.	\$44,000
---	----------

Above costs include tax and labor

## DAIRY BARNs

### DAIRY EQUIPMENT

#### HEAT RECOVERY SYSTEM

Heat recovery system and all hardware.	\$10,000
--	----------

#### HOT WATER SYSTEM

Boiler with insulated 500-gallon storage tank, insulated piping, and electrical.	\$13,500
--	----------

#### SPRINKLER PEN HARDWARE

Pumps, Rainbird, and all related pipelines and miscellaneous hardware.	\$19,000
--	----------

#### AIR COMPRESSOR

10 H.P. air compressor with 120-gallon tank. Includes miscellaneous hardware and electrical.	\$7,500
--	---------

#### ELECTRIC OR AIR CROWD GATE

30 to 50 foot electric gate with track and control kit, motor, panel, and electrical.	\$16,000
---	----------

Above costs include tax and labor

Total equipment cost for double 30 parallel \$450,000 Rounded

#### EQUIPMENT ONLY (Including tax and labor)

Double 14' Parallel	Total - \$270,000 to \$280,000
Double 16' Parallel	Total - \$295,000 to \$305,000
Double 18' Parallel	Total - \$315,000 to \$335,000
Double 24' Herringbone	Total - \$385,000 to \$410,000
Double 25' Parallel	Total - \$400,000 to \$420,000
Double 30' Parallel	Total - \$435,000 to \$470,000
50-Cow Rotary Barn	Total - \$535,000 to \$560,000

## DAIRY BARNS

### FREESTALL BARN

#### STANCHIONS, LOOPS, AND FENCES

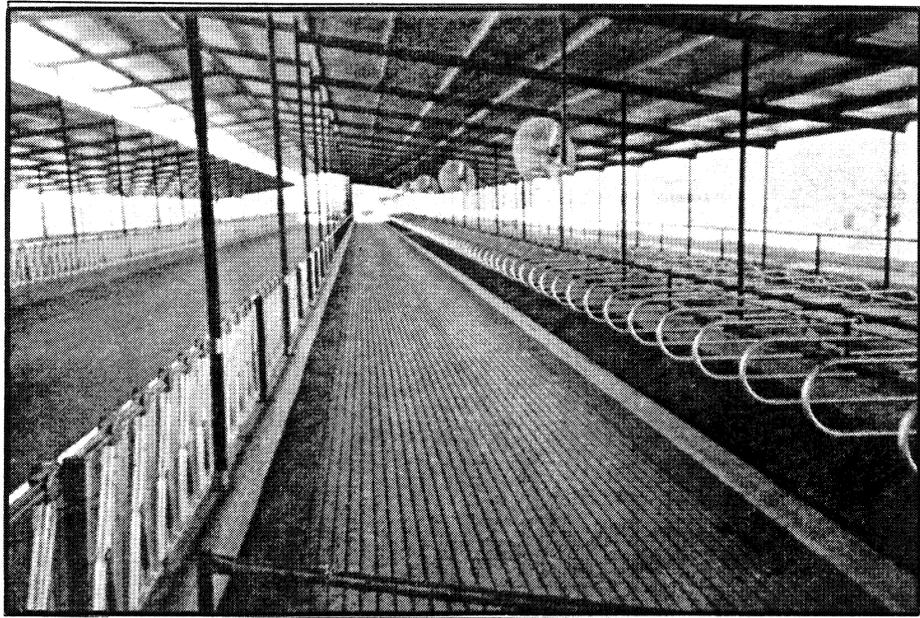
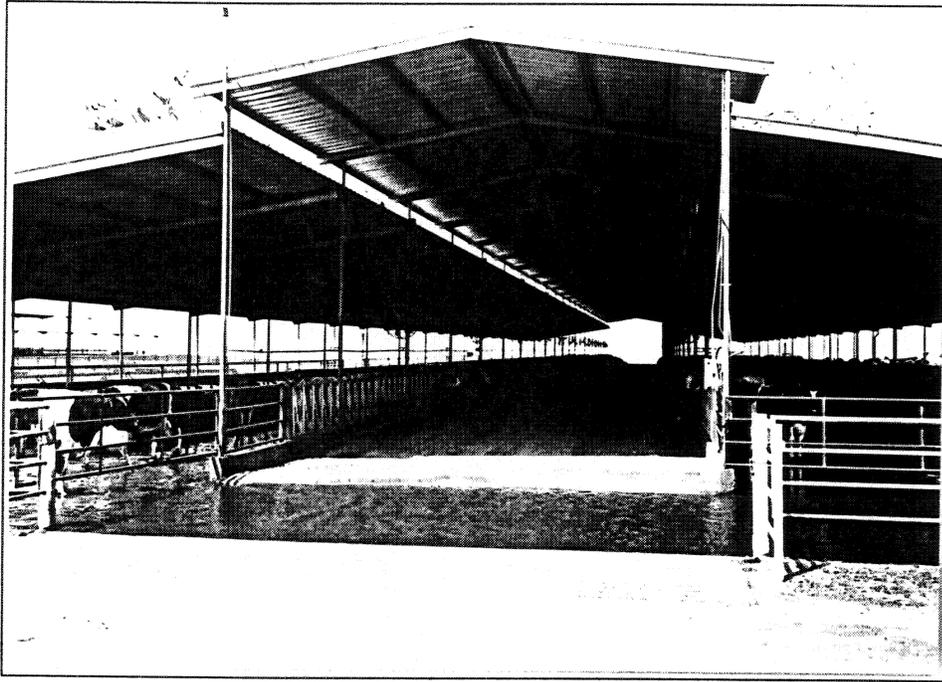
Foundation	Reinforced concrete
Floors	Sloping concrete with dirt in loop areas. Concrete drive lanes and flush areas.
Walls	Open; poles with steel supports
Roof Structure	Steel frame with steel cover; good quality, with gutters
Electrical	Minimum lighting
Plumbing	Water troughs in each pen with underground flushing
Stanchions	Steel; self locking – 5 hole per 10 feet
Fencing	Cable with steel or wood posts
Capacity	250 to 600 cows; one stanchion per cow
Cost	<b>\$675 to \$790 per cow or \$6.75 to \$7.90 per square foot</b>

Some barns now have 10% more stanchions and cows than beds.

Hot dipped galvanized steel framed barns – add 5% to above costs.

# DAIRY BARNS

## FREESTALL BARN



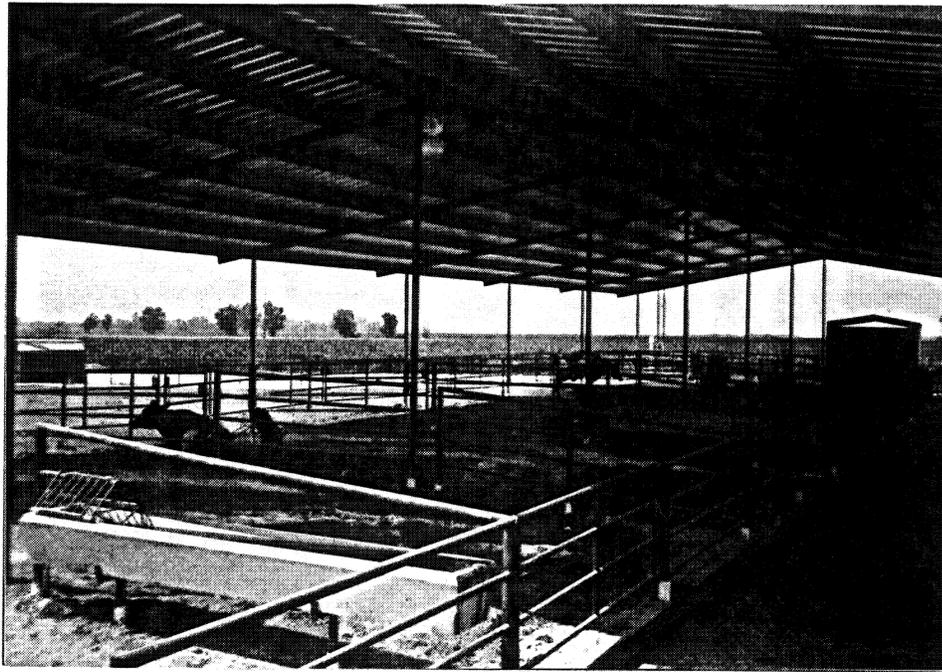
# DAIRY BARNS

## HOSPITAL BARN

### AVERAGE QUALITY

Floors	Concret slab with flush curbs
Walls	Light steel poles, all sides open
Roof	Average wood frame or light metal, with metal cover
Interior	Several small pens with metal pipe fencing and gates and water troughs
Electrical	Average light fixtures
Plumbing	Concrete water troughs
Cost	<b>\$5.85 to \$6.15 per square foot</b>

Hospital barns without small divided pens, with dirt floors, low to average quality: \$4.25 to \$4.75 per square foot



Hospital Barn – Average Quality



## DAIRY BARNS

### CORRALS

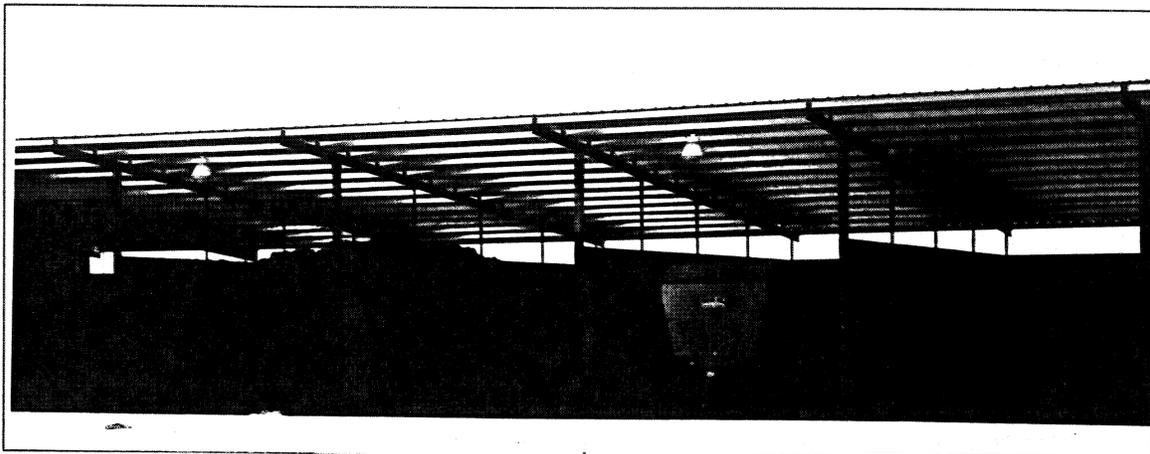
Components	Cost
Concrete Flatwork Large areas/not reinforced	3½" to 4½"—\$1.45 to \$1.70 per square foot 6"—\$1.80 to \$2.20 per square foot
Rubber Belting	\$1.25 to \$1.75 per square foot
Curbs	8" x 16"—\$6.00 per lineal foot 8" x 24"—\$7.50 per lineal foot
Cable Fence	2 3/8" top rail, 2 7/8" post—10' o.c. 3 cable—\$7.00 per lineal foot 4 cable—\$7.50 per lineal foot
Concrete Water Tank	\$400 each
Steel Stanchions Without Stanchion Curb	\$36.00 to \$40.00 each hole \$16.00 to \$20.00 per lineal foot
Steel Self-Locking Stanchions Without Stanchion Curb	\$38.00 to \$42.00 each hole \$19.00 to \$21.00 per lineal foot
12" PVC Flush Line	\$9.00 per foot
Sump Pumps	3 HP \$2,600.00 5 HP \$3,500.00
Floating Agitator Pump	75 HP \$15,000 to \$17,000 40 HP \$11,000 to \$12,000
Gates	12' to 16'—\$120 to \$150 each
Loafing Sheds	Wood—\$3.65 - \$4.60 per square foot Steel—\$4.10 - \$5.25 per square foot

### COMMODITY BARNES

	Per Square Foot
With Dividers	\$8.25 - \$11.25
Without Dividers	\$7.00 - \$9.00

### COMMODITY BARN ADDITIVES

Concrete Dividers—8' high 6" thick	\$72.00 per lineal foot or \$9.00 per square foot
------------------------------------	---

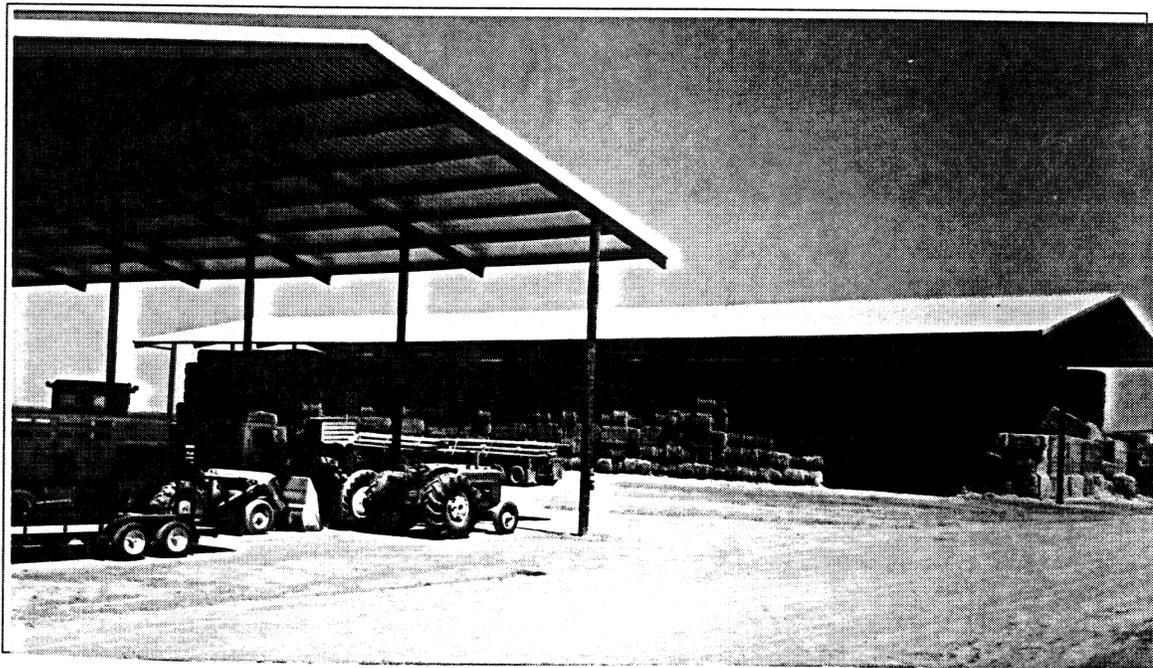
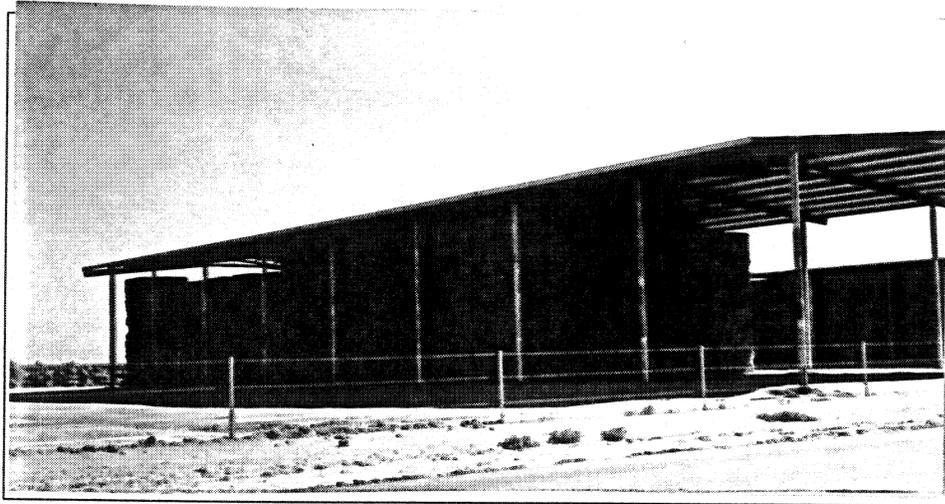


Commodity Barn with Dividers – Average Quality

## DAIRY BARNS

### HAY BARNS

Floors	Dirt
Walls	Open; used oil field pipe to support roof
Roof	20' eave; low pitch; light wood or steel frame; metal cover
Electrical	None
Plumbing	None
Cost	\$2.50 to \$2.90 per square foot



# DAIRY BARNS

## MISCELLANEOUS

### CURBS

	Per Lineal Foot
8" x 8"	\$3.50
8" x 16"	\$5.50 to \$5.75
8" x 20"	\$6.50

### CABLE FENCE

	Per Lineal Foot
2 3/8" top rail with 2 7/8" post 10' o.c.	3 cable—\$7.00 4 cable—\$7.50 5 cable—\$8.00
Cattle guard	\$1,000 each

### SOLID RAIL FENCE

	Per Lineal Foot
(4) 2 3/8" rails with 2 7/8" post 10' o.c.	\$10.50 - \$11.50

### TANKER PAD

	Per Square Foot
6" to 7" rebar reinforced concrete with footings	\$2.20 - \$2.45

### WATER TROUGHS

Concrete Water Troughs - 2' x 12'	\$350 to \$375
Concrete Water Troughs - 2' x 16'	\$425 to \$450
Mineral Troughs - 20'	\$125 to \$150

### CORRAL SHADES

	Per Square Foot
Pipe poles, wood frame, metal cover	\$1.60 - \$1.75
Pipe poles, steel frame, metal cover	\$1.75 - \$2.00

### WATER LINES

2" Water line	\$1.45 per lineal foot
3" Water line	\$1.65 per lineal foot
12" Flush line	\$9.00 per lineal foot
18" Drain line	\$11.40 per lineal foot
Flush valves	\$900 each
Drain boxes	\$1,000 each

# DAIRY BARN

## MISCELLANEOUS

### SEPTIC TANKS

1,000 – 1,500 gallon with lines	\$3,500 - \$4,000
Cistern - per gallon	\$.55

### BARN FANS

With misters and automatic controls	\$500 to \$600 each—installed
-------------------------------------	-------------------------------

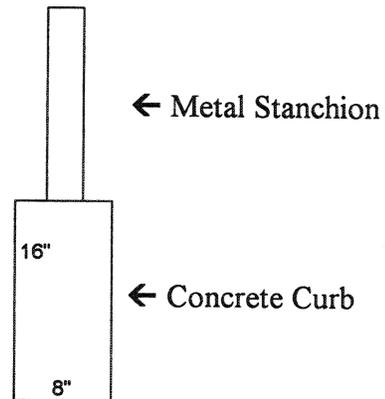
### FEEDLANE STANCHIONS WITH CURB

Galvanized stanchions, 5-hole/10'  
Cow-type self-locking with release  
with 2 7/8" post in 8" x 16" concrete curb

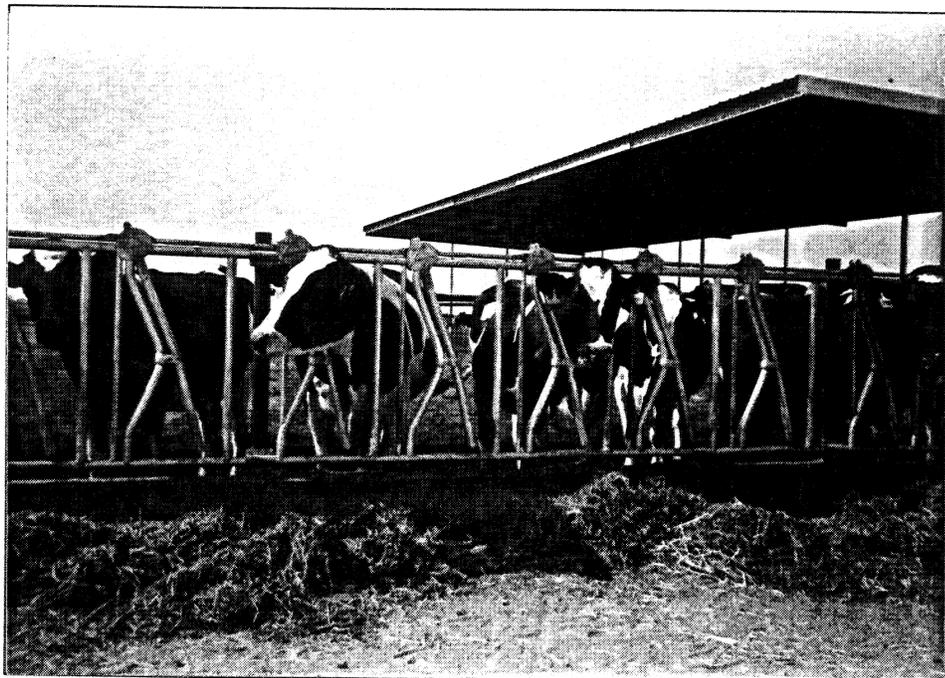
Cost Per Lineal Foot: **\$27.00**, stanchion and curb only

Additional concrete

- Drivelane 6" reinforced - **\$1.75 - \$2.10** per sq. ft.
- Walklane 4" concrete - **\$1.40 - \$1.60** per sq. ft.
- Flush curb 8" x 8" - **\$3.50** per lineal foot



Cow lane 12' wide with locking stanchions and stanchion curb and 10' feed lane	<b>\$62.50</b> per lineal foot
--	--------------------------------



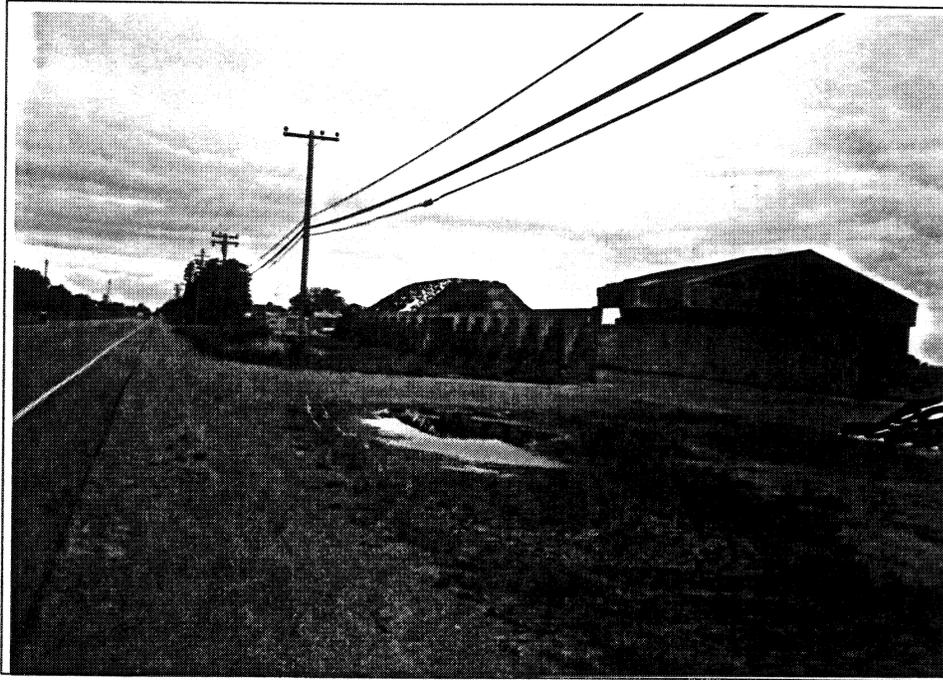
Feedlane Stanchions

## DAIRY BARNS

## SILAGE PITS

Tilt-up of 6" concrete or 8" reinforced concrete block, 8' high, and enclosed on three sides with 6" concrete slabs.

<u>Size</u>	<u>Price Per Square Foot</u>
75 x 100	\$3.90
100 x 200	\$3.25
100 x 300	\$3.10



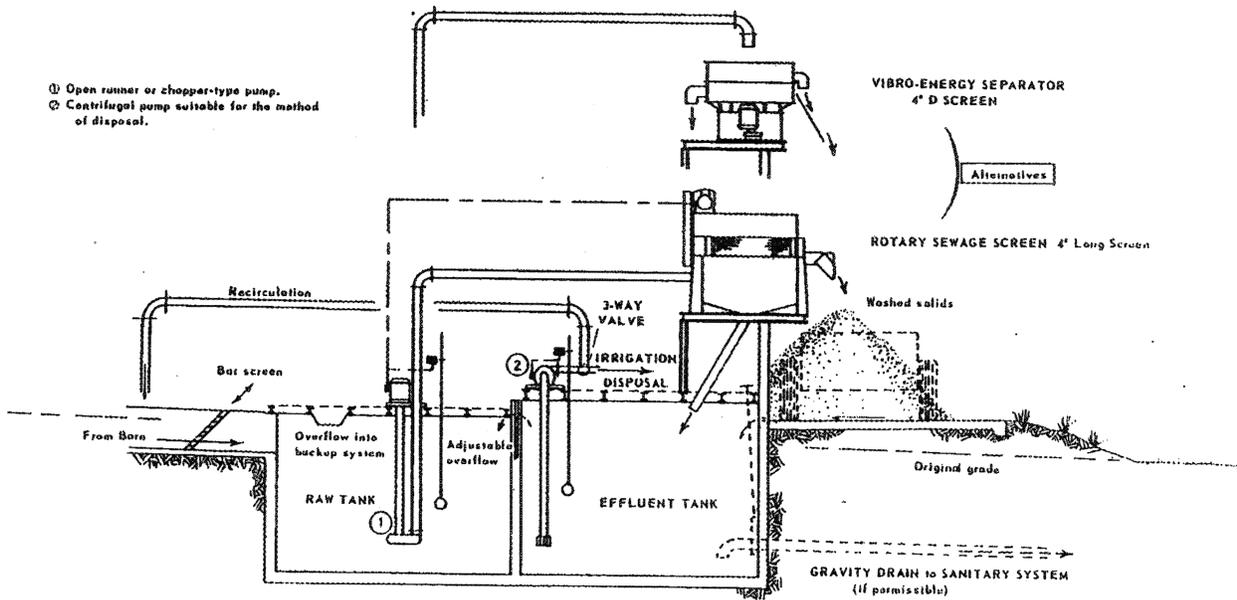
Concrete Silage Slab Only

5 ½" to 6" reinforced with footings - \$1.90 to \$2.20 with footings

# DAIRY BARN

## LIQUID MANURE SYSTEMS (Manure Separator)

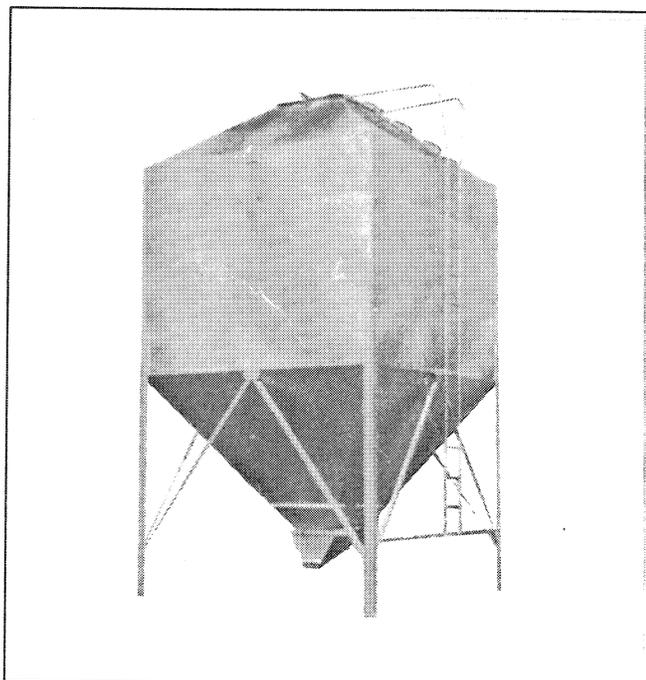
Cost includes tanks, pumps, screens, valves, pipes, sump, and drainage system, but excludes cost of all holding ponds or lagoons. Typically one unit per 800 to 1,000 cows. **\$34,000 - \$42,000**



## DAIRY BARNS

### PAINTED STEEL BULK FEED TANKS ON CONCRETE PAD/With Hopper Bottom

<u>Components</u>	<u>Cost</u>
5 Ton	\$1,600
9 Ton	2,300
10.5 Ton	2,450
13 Ton	2,700
15 Ton	3,000
20 Ton	3,800
25 Ton	4,200
31 Ton	4,900
34 Ton	5,100
40 Ton	5,800
45 Ton	6,700
60 Ton	7,400



### ADDITIVES AND ACCESSORIES

Feeder lines (Per lineal foot)	\$ 6.90
Partition	300.00
Ladder	90.00 -140.00
Augar	190.00 - 225.00

## DAIRY BARNs

### GRADE "B" BARNs

Use upper end of cost range for Sacramento Valley and north

#### MILK HOUSE

Foundation	Concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 5 percent of wall area
Interior	Smooth finish plaster
Electrical	Fair fixtures
Plumbing	One wash basin
<b>Square-Foot Cost</b>	<b>\$31.25 to \$38.50 per square foot (including breezeway)</b>

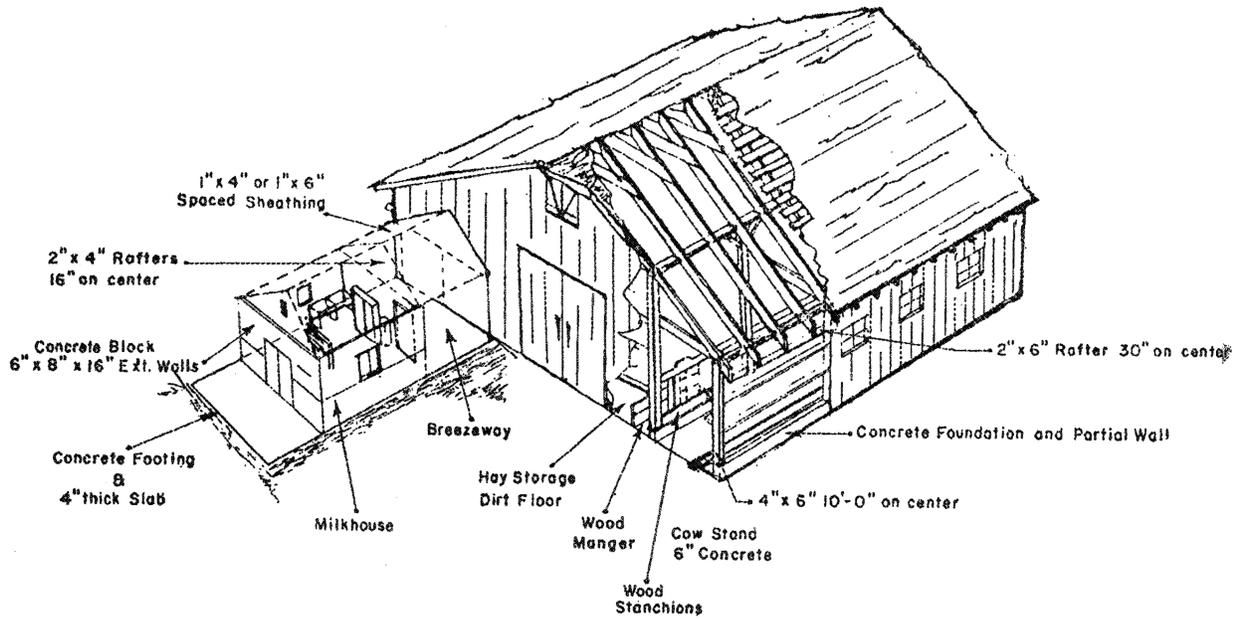
#### MILKING BARNs

Foundation	Light concrete
Floors	Concrete—cow stands
Walls	Box frame, 4" x 6"—10' on center
Roof	Average wood frame, wood shingles, corrugated iron, or aluminum cover
Windows	Barn sash
Interior	Unfinished
Electrical	None
Plumbing	None
Stanchions	Wood stanchions
<b>Square-Foot Costs</b>	<b>\$13.25 to \$16.50 per square foot</b>

Building costs do not include milking equipment

# DAIRY BARNS

## GRADE "B" BARN



TYPICAL GRADE "B" DAIRY BARN