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T I M B E R P L A N T

SHINGLE MILL

WP 495

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Introduction

The number of shingles produced in the Pacific Northwest during 1936 was 4,032,754 squares or 91.5 percent of the total number produced in the United States. This was a 25 per cent increase over 1935.

The production of shingles can be readily seen as an important industry. Six thousand men are employed directly in the mills and over $16,000,000 is invested in the shingle mills alone of the Pacific Northwest. The product furnished yearly approximately 40,000 cars of freight to the railroads and is shipped to every state in the union.

The mills which produce shingles are classed into two groups; straight shingle mills, that is, producing shingles only; and combination mills engaged in both the production of shingles and lumber. The latter class may be further subdivided into straight cedar mills and those that produce other species such as douglas fir, hemlock, and sitka spruce. However, the great bulk of shingles is produced by the exclusive mill.

Shingle Mill

The shingle mill is located on the lower portion of Nehalem Bay. Two logging camps, operating approximately twelve miles up the river, are cutting timber for a sawmill on Siletz Bay. The logs are rafted and towed down the river in boom sticks by tug boats. When the rafts reach the lower portion of the bay the logs are emptied into a log pond prior to the construction of Davis rafts

for ocean travel. The cedar logs are removed and taken to the shingle mill pond, a quarter of a mile down the bay. The pond stores enough logs for two months cut.

The mill is a two story structure with a chute running out into the water up which the logs are drawn from the pond to the second floor of the mill by means of a heavy conveyor chain. A large circular saw located at the end of the slip cuts off sections of the log as it advances into the mill.

These sections, usually termed blockes, are 16, 18, or 20 inches long depending on the length of the shingle to be manufactured.

The device for dividing the log cuts consists of a splitter operated up and down by means of steam. It has three fixed knives.

A splitting apparatus is located just behind the cut-off saw. A ball-bearing plunger about eight inches in diameter, raised and lowered by pressing a floor petal, is installed between the two conveyor chains that carry the round blocks from the cut-off saw. Inasmuch as this plunger is on ball bearings, the operator can easily and quickly turn the block in any position so as to split to the best advantage. The plunger is directly under the splitter.

As further insurance that the splitting knives will strike the block just where the operator expects, a shadow device is installed. Immediately the block moves over the plunger and under the splitter, the shadow indicates exactly where the knives will strike. Three shadows are cast on the top of the block, one for three thicknesses of block. This takes care of any length of block that may be going into the mill without adjusting the shadow device.

As soon as the block is in the proper position, the operator

pulls a lever which is just above his head. The splitter drops rapidly and immediately flys back into position. The knives enter the block for a distance of not to exceed an inch.

The cut-off saw controls have been established which cause the saw to come forward and through the log at a fixed speed. However, if a log comes up the slip that the operator thinks should be cut slower in order to insure a smoother cut, all he has to do is push another button and the feed of the saw automatically changes.

Controls have also been established which regulate the length of the back stroke of the cut-off saw. In other words, the saw can be automatically regulated so as to go back just far enough to clear the log.

The new method of preparing the blocks, there is no waste of timber such as ordinarily develops due to the kerf of splitting saws. In addition there is a large saving of timber after the blocks get to the machine. Where four blocks are cut from the log, the sawyer has to take off eight spalts before he starts sawing shingles, whereas when there are but three blocks he takes only six spalts.

The sawyer likes larger blocks because he does not have to put as many of them into the machine. With larger blocks the machine cutting shingles a greater percentage of the time.

Another advantage of cutting the blocks into three instead of four pieces, is that it is possible to obtain more wide shingles and more vertical grain stock. The shingles average 1 1/4 inches wider with the 3 block plan.

The smaller blocks produced in this splitting operation are passed to a third saw called the knee-bolter where the bark is trimmed off and any surface defects cut out. When this operation is completed the blocks are ready to be placed in the shingle machines and are taken by means of another conveyor to the location of the machines. The prepared blocks are taken by the machine operator called the sawyer and placed on the carriage of the machine where they are securely gripped in an automatic feed works. The carriage is driven by an eccentric crank from a geared drive. The carriage then moves forward and backward against a high speed circular saw. The blacks are tilted after two backward motions of the carriage to produce two tips at the top of the block and two butts at the bottom, and then vice-versa.

These machines are known as double butting machines to distinguish them from machines which tilt the block with each backward motion of the carriage.

The blocks are placed in the carriage so that the saw cuts shingles from the face of the block produced in the splitting operation, thus producing edge grain shingles. The sawyer must adjust the block as number of times during the process of sawing so as to keep the cutting face perpendicular to the grain.If the the block is not changed, slash or flat grain shingles result in part.

The machines are of the upright type with the saw running in a vertical plane. The saws are from eight to ten gauge in the center tapering to 16 to 19 guage on the rim. The saws are 40 inches diameter and have 80 teeth.

The 4 machines each produce an average of 28 squares of shingles in eight hours.

The sawyer removes the shingles as they are cut. He squares up the ends and cuts out the defects by means of a trim-saw or clipper directly in front of him. He then completes his part of the work by passing the shingles down a chute to bins on the floor below. Defective shingles go in a separate bin and are not mixed with the better grades.

Packers or weavers stationed beside the bins pack the shingles in bundles of a standard size, bind them, grade the bundle, and place them on a conveyor.

The conveyor takes the bundles to the storeroom where they are either temporarily stored to be shipped green or placed on a kiln car. Two kiln cars are run in and out of the dry kiln daily. These kiln cars hold about 50 squares. The charges remain in the kiln 7 days in order that drying will take place slowly at a temperature of 180°.

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Summary of Sizes, Packing Rules, Running Inches and Shipping Weights

See Note No. 1 — See Note No. 2

Grades	Shingle Thicknesses (Green)	Approximate Bundle Thickness, Inches		Random Widths	No. of Courses per Bundle	No. of Bundles per Square	No. Running Inches per		Shpg. Wts. per Sq.
		Green	Dry	Max. Min.			Bundle	Square	
No.1—24″(Royals)	4 Butts =2″	6½/7	6⅛/6¾	14″ to 4″	13/14	4	499	1996	192
No.1—24″ " (sidewalls)	4 Butts =2″	6½/7	6⅛/6¾	14″ to 4″	13/14	3	499	1497	144
No.1—18″(Perfections)	5 Butts =2¼″	8⅛	7⅞	14″ to 3″	18/18	4	666	2664	158
No.1—16″(Perfects 5X)	5 Butts =2″	8	7¾	14″ to 3″	20/20	4	740	2960	144
No. 2—24″ (16″ Clear)	4 Butts =2″	6½/7	6⅛/6¾	14″ to 3″	13/14	4	499	1996	192
No. 2—18″ (12″ Clear)	5 Butts =2¼″	8⅛	7⅞	14″ to 3″	18/18	4	666	2664	158
No. 2—16″ (12″ Clear)	5 Butts =2″	8	7¾	14″ to 3″	20/20	4	740	2960	144
No. 3—24″ (10″ Clear)	4 Butts =2″	6¼/6¾	6/6½	14″ to 3″	13/14	4	499	1996	192
No. 3—18″ (8″ Clear)	5 Butts =2¼″	7⅞	7⅝	14″ to 3″	18/18	4	666	2664	158
No. 3—16″ (8″ Clear)	5 Butts =2″	7¾	7½	14″ to 2½″	20/20	4	740	2960	144

No. 1 and No. 2 Grades Dimensions	Shingle Thicknesses (Green)	Widths (Green)	No. of Courses per Bundle	Additional Cross Shingles	No. of Bundles per Square	No. Pieces per Bundle	Shpg. Wts. per Sq.
24″ x 6″	4 Butts =2″	6″	14/14		4	84	192
24″ x 6″ (sidewalls)	4 Butts =2″	6″	14/14		3	84	144
18″ x 5″	5 Butts =2¼″	5″	16/16	8	4	136	158
18″ x 6″	5 Butts =2¼″	6″	17/18	8	4	113	158
16″ x 5″	5 Butts =2″	5″	18/18	8	4	152	144
16″ x 6″	5 Butts =2″	6″	19/20	8	4	125	144

Covering Capacities in Square Feet of the Various Sized Shingles

Square Pack

Size of Shingles		No. Bdls. per Sq.	Number of Inches Exposed to the Weather														
			4″	4½″	5″	5½″	6″	6½″	7″	7½″	8″	8½″	9″	9½″	10″	10½″	11″	11½″
1 Square of 16″ —5/2 will cover on.....	Roofs	4	80	90	100	grea	ter e	xpos	ure	not r	ecom	mend	ed.					
	Sidewalls	4				110	120	130	140	150	great	er ex	posur	e not	r e c o	m m e	nded.	
1 Square of 18″ —5/2¼″ will cover on.....	Roofs	4	70	80	90	100	gre	ater	exp	osure	not r	ecom	mend	ed.				
	Sidewalls	4					110	120	125	135	145	155	great	er exp	osure	not r	ecom	md'd.
1 Square of 24″ —4/2″ will cover on.....	Roofs	4					80	90	95	100	great	er exp	osure	not r	ecom	mend	ed.	
	Sidewalls	3					60	65	70	75	80	85	90	95	100	105	110	115

Formula for Figuring Covering Capacities per "Square"

FORMULA:

$$\frac{\left\{\text{Total number of courses in both ends of bundle}\right\} \times 18\tfrac{1}{2} \times \left\{\text{Running inches in each course}\right\} \times \left\{\text{Number of bundles in square}\right\} \times \left\{\text{Number of inches exposed to weather}\right\}}{144} = \text{Number of Square Feet that 1 Square will cover.}$$

FOR EXAMPLE:

Find covering capacity of 1 Square 16″ shingles exposed 5″ to the weather:

$$\frac{(20 + 20) \times 18.5 \times 4 \times 5}{144} = \frac{14800}{144} = 102 \text{ square feet.}$$

4	bundles–16″ = 1 square at	5″ exposure
4½	bundles–16″ = 1 square at	4½″ exposure
5	bundles–16″ = 1 square at	4″ exposure

Note No. 1.—A small amount is allowed for shrinkage from green to dry wood. See grading rules for specific grade measurements, and also note third column, this table.

Note No. 2.—No definite number of random width shingles are packed in a bundle; minimum contents is determined by actual running (combined width of shingles laid side by side) inches of wood contained.

OPERATING COSTS

Sawing, Packing, and Miscellaneous Expenses

	Per M
Packing	$0.15
Sawing	.25
Bands, irons, nails	.07
Grease & oil	.007
Industrial insurance	.019
Light & power	.020
Repairs, machinery	.058
Repairs, building	.026
Saw expense	.048
Kiln upkeep	.011
TOTAL	.659

LABOR EXPENSE

	Per Day
Foreman	7.50
Filer	8.00
Boom man	5.00
Cut-off man	4.00
Splitter man	4.00
Block piler	4.00
Engineer	5.00
4 Sawyers	25.00
4 Packers	20.00

1 Kiln operator	5.00
2 Firemen	8.00
TOTAL	$95.50

	Per Month
Insurance	129.16
Taxes	76.00
Rents	100.00
TOTAL	305.16

Depreciation

	Per Month
Equipment	250.00
Buildings	80.00
TOTAL	330.00

	Per Month
Reserve for bad debts	.020
Reserve for contingencies	.030
Reserve for shutdown	.020
TOTAL	.070

Summary

Packing, sawing, etc.	.659
Labor expense	4.24
Insurance, taxes, etc.	.58
Depreciation	.59
Bad debts, shut-down, etc.	.07
TOTAL	6.07

Note:

Daily cut of 4 machines, 8 hr. day, - 23 M

Monthly cut of 4 machines, 6 day week, - 552 M

Depreciation computed on 15 year basis.

Generator in the engine room furnishes electricity for motors, saws, etc.

The filing room on the second floor is larger than necessary, however, the front part can be used as an office or if the space is all ready provided for an office, it can be used to store equipment in.

Ample storage space has been furnished for both the shingle blocks and packed shingles. Space for the blocks has been provided to take care of a night shift without running the cut-off saw, splitter, using a boom man, etc. Space for packed shingles was provided because over half of the manufactured product is cargo shipped green, hence the need for a large quantity of packed shingles on hand when the boat comes in. The trend is getting away from shipping green shingles in preference to kiln dry shingles, however, the space proviso would still hold.