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An improved system of cost control and budgeting by product, for a specialty paper mill

Linwood Douglas Hogge

L. D. Hogg -
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An Improved System of Cost Control and Budgeting, By Product, for a Specialty Paper Mill

By

Linwood Douglas Hogge

A Thesis Submitted to the Faculty of the Graduate School of the University of Richmond in Candidacy for the Degree of Master of Science in Business Administration.

Approved by:

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CHAPTER I

HISTORICAL DEVELOPMENT OF ALBEMARLE PAPER MANUFACTURING COMPANY AND SUBSIDIARIES

Hollywood Mill, built in 1007, was the first unit of the Albemarle Paper Manufacturing Company. This mill has been added to, deleted from, and revised many times over its 73 year existence, but still serves its basic purpose of manufacturing finished paper from raw pulp. The mill lies at the extreme north end of Tredegar Street in the heart of Richmond, between the old Kanawha Canal and the James River, just below historic Hollywood Cemetery. The name of the mill was taken from the cemetery. Since the main body of the text will be devoted to this unit and its operations, we will proceed to other company additions over the years.

Brown's Island Mill, housing now two paper machines plus auxiliary equipment, was purchased in 1919. At that time it was incorporated as Dixie Paper Mills and contained only one paper machine. Over the years it has expanded greatly in manufacturing capacity, sales volume and profit potential. In addition to 180 paper mill employees, Raymond Bag Corporation, an Albemarle subsidiary, retains space and approximately 35 employees for a printing operation. This mill is located at the south end of Tredegar Street, about half a mile distant from Hollywood. It is literally an island, connected to Tredegar Street by two bridges, one of which is capable of supporting heavy truck traffic. There is also a railroad spur which runs into the VEPCO Twelfth Street Station and eventually the Southern Rail Road Yards. It will be noted that almost a third of a century elapsed before Albemarle made its first major expansion. The Brown's Island location was reportedly shelled by Union gun boats during the Civil War; at that time it was part of the Tredegar Arsenal.

Riverside Mill was the next addition of the Company, built on Albemarle property in 1924. This plant, a large four story masonry structure, is directly across Tredegar Street from Hollywood Mill and adjacent to the James River. It originally contained one paper machine, since moved to the Halifax Division. Riverside now houses the firm's Waterproof Division, whereby kraft paper is laminated to liquid asphalt; This product has many uses, principal among them being its use as building paper. The building also has space used by Raymond Bag, as does Brown's Island. This space is used for manufacturing multiwall bags, used extensively for packaging industrial goods, such as fertilizer and cement. The two operations employ approximately 100 people.

Thirteen years were to expire before Halifax Paper Company was purchased in 1937. This operation is located in Roanoke Rapids, North Carolina, about 90 miles from Richmond and just several miles beyond the state line. At the time of purchase it was a small kraft paper and pulp mill. Today it is Albemarle's largest single unit. The pulp mill is now capable of producing almost 800 tons of kraft sulphate pulp every 24 hours, and maintains an inventory of 30,000 cords of wood on hand at all times, using over 900 cords a day during peak loads. The majority of this pulp is used in the paper making process at Halifax although a sizeable percentage is shipped to the Richmond mills for their use as raw materials. Four paper machines are located at Roanoke Rapids, two of them being very large, modern, high speed machines. These two machines went into operation in 1953 and 1959, respectively. About 750 employees are retained on a permanent basis at Halifax.

Surrounding and in the general area of the Roanoke Rapids plant is the company's timber land operation. Almost 300,000 acres of land are either owned or leased, most of them in eastern North Carolina, with a small percentage of the acreage being maintained in Virginia and South Carolina. The timber operation is somewhat gigantic in scope, with the emphasis placed on good wood land management. With a staff of 15 trained foresters, plus auxiliary forces, timber is now being grown faster than it is being cut. This seems almost incredible in light of the heavy daily usage of pulp wood, and the fact that a pine tree (the basic raw material) must be fifteen to twenty years old before it is ready for cutting as pulp wood. Timber cutting and hauling is done both by company employees and those retained on a part time basis, notably farmers during their off season.

It is helpful at this point to review the location and size of the company's seven paper machines, since they are the basic manufacturing units. All seven, incidentally, are Fourdrinier type units with conventional drying systems:

Hollywood	-	One 80" Machine
Brown's Island	-	One 100" Machine
	-	One 120" Machine
Halifax	-	One 90" Machine
	-	One 100" Machine
	-	Two 224" Machines

Raymond Bag Corporation of Middletown, Ohio was acquired in 1955. This subsidiary now maintains about 350 employees in its Ohio and Richmond operations. The base purpose, as mentioned in the discussion on Riverside Mill in the Richmond Division, is

the manufacture of heavy duty multiwall bags used in the industrial trade. The Ohio unit consists of a modern up-to-date plant with large inventory areas. The Richmond operation is similar but much smaller. Altogether seven tubers, the basic producing unit, are maintained.

Interstate Bag Company in Walden, New York was added in 1957. This firm manufactures paper shopping bags, such as are seen in most department stores. Interstate is known in its particular trade as a real "go-getter". It employs almost 200 people as of this writing.

The next manufacturing operation obtained was the James River Pulp Company at Columbia, Virginia on the James River (about 45 miles North West of Richmond). It has about 30 employees and makes ground wood pulp, used in manufacturing in Richmond. A small portion of this pulp is sold on the outside market.

Randolph Paper Box, on the south side of the James River in Richmond, was purchased in 1959. It employs about 65 people and makes set-up and folding boxes for packaging use in many industries, principal among these being food and tobacco.

Richmond Container Corporation, located in the same area as Randolph was also acquired in 1959. It manufactures corrugated boxes and containers and is slightly larger than Randolph, employing almost 90 employees.

The most recently purchased firm was Albemarle Container Corporation in Baltimore, Maryland. It is similar to Richmond Container Corporation in products and goals, but is only about half its size in sales and in number of employees.

A new saturating plant was built in 1960, and is located next to the Hollywood Mill. It will saturate many paper grades made by the company machines, for sale to various industrial consumers. Hollywood will supply the majority of what to the saturating plant is raw material. This plant is under the management of the Waterproof Division.

Albemarle has also acquired some non-operating interests. Chief among these was most of the property and land of the old Tredegar Iron Works, founded in 1830 and known as the "Arsenal of the Confederacy". The Tredegar firm now operates in Chesterfield County, just off the Petersburg Pike. This purchase was invaluable as a site for expansion, its 23 acres previously separating the 9 acres at the Hollywood and Brown's Island areas. This land now is used primarily for inventory storage of both raw materials and finished goods. In addition it houses the Technical Division office.

Part of the machinery and equipment of Consolidated Paper and Box, located on Cary Street in Richmond, was recently obtained and installed at Randolph Box. This permits Randolph greater flexibility and additional manufacturing capacity.

A city block and a half has been acquired on Gamble's Hill, at the foot of Third Street and overlooking the Tredegar site. All buildings in this area have been razed, in preparation for a new main office building to replace the old one in the Hollywood area. The contract has not been let as yet but all preliminary architectural and engineering work has been completed.

All of these non-operating assets have been acquired within the last five years. This composite picture affords a broad perspective upon

which to deal with our more specific objective of costing and budgeting for one company unit, a somewhat unique unit as we will later find.

Company sales are primarily confined to the Eastern portion of the United States, to that area roughly east of a line drawn between New Orleans and Chicago. Sales are made on a lesser basis, however, to the Western part of the nation as well as export trade to some degree. While the firm primarily sells through its own Sales Department it also retains some manufacturing agents, jobbers and selling merchants. Sales, as previously mentioned, are to the industrial rather than the consumer trade. Permanent sales offices are maintained in New York, Chicago, Philadelphia, Columbus, and Charlotte by paper sales and in these plus other nearby cities by bag and converting sales forces.

A capsule summary of overall operations, both staff and manufacturing is as follows: (Operating Divisions are largely self contained, with their own maintenance, power, engineering staffs, etc. Staff operations work with all divisions).

<u>Staff</u>

Sales

Traffic

Accounting

Billing

Purchasing

Financial

Technical

All of the above groups report to top management personnel,

generally officers of the corporation, as do the operating divisions. All officers report to and are responsible to the President. This is a somewhat unwieldy arrangement, due in large part to the firm's "growing pains", and will be changed to a more streamlined organization in the near future.

Operations:

Richmond Division

Hollywood Mill

Brown's Island Mill

Waterproof Plant (Including Saturating Plant)

James River Pulp

Halifax Division - Pulp, Paper and Wood Lands

Raymond Bag - Ohio, Richmond

Interstate Bag

Randolph Paper Box

Richmond Container

Albemarle Container

It can be seen from the foregoing review that the Albemarle Company has and is experiencing a growth period, particularly in the last decade and more specifically in the last five years. Annual sales, expected to approach $50,000,000 in fiscal 1960-61, are expected to reach $100,000,000 in 1965 through growth and merger. This will result in a five fold expansion in a period of ten years, or a 250% volume increase from 1955 to 1965. While far from being one of the giants of the industry, the company is rapidly leaving behind it the sense of being small and entering the medium sized category.

Stockholder participation is increasing along with the overall increase in company facilities. Albemarle, incidentally, is a public owned stock corporation (although somewhat closely controlled) and its three classes of stock are,

for the most part, available in the over-the-counter market.

Basically the policy of Albemarle is the attempt, within reason, of partial control of its own supply and demand, by vertical integration from the pine tree to the finished industrial paper product. In a sense this is a limited attempt at control of its own market, and while such a policy could be questioned in a depression market, it does appear sound in our economy of recent years. It is a good approach to growth, and survival, and probably the only realistic one in the fast growing paper industry, ranked fifth and approaching fourth in the nation's basic industries.

The table below will indicate the rate of growth of Albemarle as previously discussed, pointing out in particular the rapid growth rate of recent years. Only selected data is shown, from a wealth of available material, but this data keynotes the growth rate.

Following the growth rate table is a company organization chart, carried down to the division or staff department level. Hollywood Mill is one of the four operating plants in the Richmond Division, the others being Brown's Island, Riverside (Waterproof) and James River Pulp.

	FISCAL YEAR ENDED:					
	Apr. 3,1960	Mar. 29,1959	Mar. 30,1958	Mar. 31,1957	Apr. 1,1956	Apr. 3,1955
Net Sales	$40,758,944	$32,902,454	$31,850,880	$32,063,107	$26,768,749	$20,144,562
Net Income	$ 2,139,049	$ 2,133,300	$ 1,921,007	$ 2,305,040	$ 1,608,255	$ 669,219
Working Capital	$ 7,950,568	$ 9,143,917	$ 7,640,165	$ 6,790,023	$ 3,458,134	$ 3,447,958
Current Assets/Current Liab.	$ 3.22/1.00	$ 3.91/1.00	$ 3.92/1.00	$ 2.73/1.00	$ 1.64/1.00	$ 2.81/1.00
Physical Expenditures	$ 5,252,144	$ 6,699,122	$ 2,957,526	$ 5,557,245	$ 3,009,303	$ 1,451,386
Common Stock-Shares O. S.	971,803	760,992	699,761	621,020	542,880	271, 440
Book Value/Share	$ 10.50	$ 17.48	$ 15.31	$ 13.92	$ 11.26	$ 9.39
Pulp Produced (Tons)	225,908	163,504	149,539	159,043	135,902	117,144
Paper Produced (Tons)	230,575	154,387	146,069	151,540	146,155	120,904
Employees	2,211	1,936	1,950	1,925	1,891	1,388
Wages, Salaries Paid	$12,598,378	$ 9,944,907	$ 9,406,036	$ 8,977,965	$ 6,831,660	$ 5,693,439

Source: Albemarle Paper Manufacturing Company, Annual Report, March 31, 1960

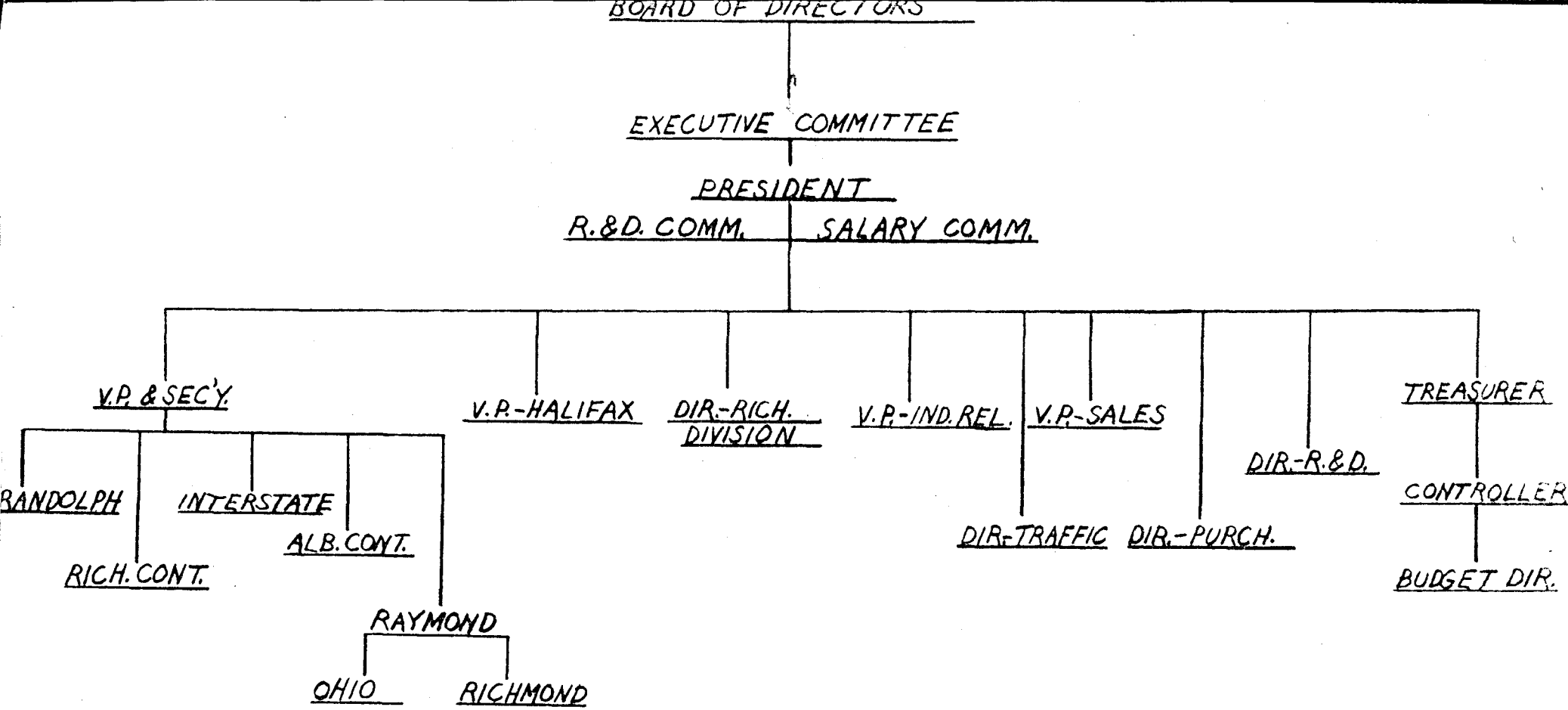
It is fully expected that the annual report for fiscal 1960-61 will follow, and surpass the records of recent years, in most respects.

Several points of clarification are probably necessary for a better summation of the preceding growth chart.

It will be noted that a very large jump in profits occurred from 1955 to 1956. This was largely due to the effect of #3 paper machine at Halifax, combining the addition of substantial new tonnage and high unit profits.

The working capital ratio has substantially increased in recent years, due in large part to the liquidation of old debits. In addition the firm obtained a large amount of capital in the Tredegar transaction, with little in the way of debt resulting from this negotiation.

It appears that the number of employees has climbed too rapidly for such an industry as ours. This is due almost completely, however, to the emphasis on the purchase of converting operations. These operations, unlike paper making facilities, have a high ratio of employees per sales unit. It is true that a large paper machine can be compared to a chemical process plant, with a lot of valves and piping and few employees.



ALBEMARLE PAPER MFG. CO.

CHAPTER II

HOLLYWOOD MILL - A HISTORY; PRESENT ORGANIZATION; SOME COST ASPECTS

In the preceding chapter we dealt with Albemarle as a whole. Here we will trace the cycles and growth pattern of one operating unit of the company.

It is noted that Hollywood Mill spans the entire life of Albemarle, since it was its first unit and has operated continuously, with some minor exceptions, for 73 years. In many respects it has paralleled the pattern of the entire company. For many years it could be considered a static, rather than a dynamic organization. The last decade, and the past 5 years especially, have seen a steady upward climb as regards capacity, profits and future potential.

Physically the present day mill is almost a city block long and four stories high. It is bound on one end by a VEPCO power unit and tail race, on the other by a city power sub-station. One side of the mill borders on the Chesapeake and Ohio tracks and the Kanawha Canal, the other side bordering on Tredegar Street. The paper mill and its auxiliary units occupies only about two thirds of this building, the rest being devoted to various offices, shops and storage units common to the Richmond Division of Albemarle.

Hollywood was originally built as a blotting mill, and served in that capacity only for many years. Blotting paper in those days was in great demand and so continued until late in the 1930's and possibly through the second World War. Since that time its usage has declined until the last several years, where its production and consumption has leveled off and, if plotted, would resemble a plateau, preceded by a steeply declining valley.

The reason for this decline is fairly apparent. Blotting paper,

laminated and printed, often in pretty pictorial scenes, was formerly a great form of advertising media. During recent years this primary usage has been under cut by many sources - increased radio usage, television, mass reading media on the increase, and the advent of the ball point pen. There is still a substantial market for blotting papers, but the total tonnage can fairly well be predicted, and nothing in the foreseeable future will change this, either up or down. This is perhaps a strong prediction, but this sales plateau has shown no variance of any significance in almost six years, not only on the plant but on the industry basis as well.

During the 1930's the mill started manufacturing various kraft grades of paper to take up the blotting slack. This was satisfactory for several years, until the paper industry as a whole took a gigantic step from the North to the South, similar to the massive move of the textile industry. The old Northern mills were becoming beset by antiquity, a shortage of raw materials, and labor problems in general.

As with the textile industry, labor was cheap and plentiful in the South. The pine tree as a raw material covered vast acreage. The mills built in the South for the most part contained large, high speed kraft machines. They made a lot of kraft paper and they could sell it cheap. The old, small mill in this area had its back to the wall when depending upon kraft. In the late 1940's Hollywood Mill, making only blotting and kraft, was on the verge of being closed. Blotting profits were not enough to offset the kraft losses, and the mill was finally shutdown in 1949, for a period of several months. Coupled to the mill losses was the lack of capital expansion, which had started being diverted to the firm's Halifax operation. This was not long before the addition of the #3 paper machine, a $6,000,000 capital item in itself, plus needed expansion at the Halifax pulp mill. Furthermore, the damage resulting from an explosion which occurred at Hollywood in 1942 had

never been fully repaired. Failure to plan for the future over the years had also resulted in a hodge-podge of buildings within a building, with inadequate elevator capacity, and poor materials handling facilities in general.

In early 1950 the mill and its equipment were actually put on the market, and several prospective buyers made a review of this offer in the light of how the mill would fit into their scope of operations. Before a sale was consummated, however, top management reviewed the mill's potential in the specialty paper field, and withdrew the offer based upon their findings. This was done and a slow, somewhat faltering start-up was made. High grade specialty products were added to the line, plus specialty krafts, and blotting and standard krafts were kept on a continuing basis. In 1950 the mill was run on a five day, two shift (sometimes one) basis. Today the mill operates around the clock, 7 days a week. Normally there are 360 operating days per year, the other five being downtime for maintenance of a major nature, plus a one-and-a-half day shut-down for Christmas. This Christmas shut-down is the only time in which no work of any kind is being performed. Routine and repetetive maintenance is performed during daily operations.

The prime reason for the Mill's ability to run on a full time basis is the addition of the afore-mentioned specialty grades to the product line. A very rough break-down of the product mix at present is:

Blotting - 25%

Kraft - 25%

Specialties- 50%

100%

Actually several hundred grades are incorporated in the above broad categories. This presents a very difficult problem in cost analysis, as we shall later see.

As running time increased during the 1950's, so did capacity and profits, both on an overall and per unit basis. Management started putting earnings back into the plant, both on a major and minor basis. Due to the run-down condition of the plant in 1950 a lot still remains to be done, but the mill is now fully considered a major producing unit of the company, and has spread its name through its wide variety of products. Although Hollywood is a somewhat smaller unit relatively speaking, its products are sold in a much more varied market than that of the larger units.

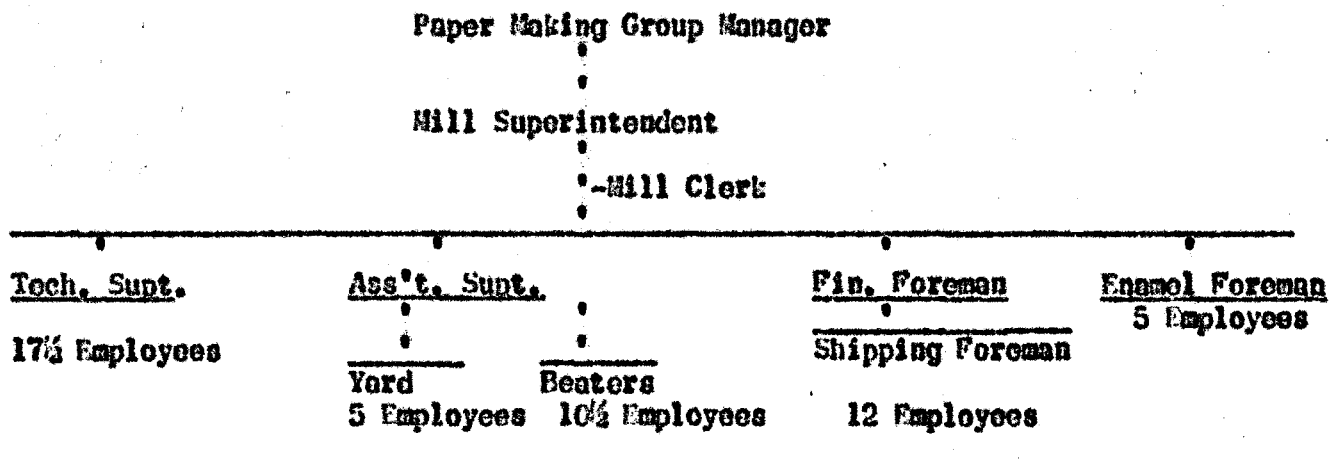
The following limited list will give an indication of these capital improvements, all taking place since 1950, and the majority since 1955:

	Approximate Cost
New Oil - Fired Power Plant	$ 130,000
New Masonry Building, Machine Room	30,000
New Masonry Pulp Storage Building (Three Stories)	50,000
Strengthening of most floors	15,000
Addition of suction press	5,000
Increased drying capacity	5,000
Partially rebuilt Fourdrinior section, Paper Machine	12,000
New White Water Tank	10,000
Materials Handling - Addition of lift trucks, rebuilding of some elevators	20,000
New Office	800
Replacement of various pumps, rolls, etc.	25,000
Removal of old equipment for storage - Beater, Re-Winder, etc.	5,000

Due to the above additions, plus many others, the Mill is now a combination of the old and the new. Capital additions are now out-stripping obsolescence, particularly in the manufacturing areas, and to a lesser extent in the Mill's converting departments.

Annual sales now run at a rate of about $2,500,000*, resulting in a net profit of about 13.5%. This profit, incidentally, has risen, to this point from the break-even point about 5 years ago. Mill supervision is now given a great deal of leniency in "calling the shots" on operations, primarily due to the overall improvement shown.

During this same time period (1950-1960) the total number of people on the mill pay roll was about halved. Today there are 57 employees engaged in papermaking and associated functions. This number does not include, of course, the various supporting groups such as maintenance, quality control, storeroom personnel, and the security force. The overall function can probably be best described with the use of an organization chart, and a brief description of the duties of each unit.



Total: 57

Supervision - 6

Clerical - 1

Hourly - 50

*Cost data for Hollywood Mill is based on actual data, but factored, so as not to reveal confidential information. All costs presented for Hollywood will be hypothetical, whereas overall company cost data is presented as is.

Management - Mill Superintendent is responsible for overall operations, and reports to paper making Group Manager, who is also responsible for Brown's Island. Mill Clerk normally works a 5½ day week, and performs clerical duties as assigned by the Superintendent.

Technical Superintendent - In charge of paper making. His crews are responsible for conversion of pulp furnish and additives into paper. There are five men on each crew, working on a 40 hour per week basis. Since this means that 3½ men are needed for each job on a full 168 hour week, a total of 17½ are needed, the 1/2 man being split between paper making and the full time quality control laboratory.

Assistant Superintendent - This supervisor has two groups under his supervision, and is charged with the movement of raw materials from receiving to paper making, or stock preparation. The yard crew's 5 employees work on a 6 day 40 hour week, and handle all incoming materials, by either rail or truck. The beater room has 3 men per shift on a 40 hour week; similar to the paper making group their extra 1/2 man spends 50% of his time in the Finishing Department. The beater group is responsible for loading the beaters with the necessary pulps, water, dyes and additives.

Finishing and Shipping - This foreman has one assistant; his twelve men are responsible for all necessary finishing and shipping of all finished goods. Assistance is given the yard crew on receiving incoming materials when time permits. This crew is on a 40 hour per week day work basis.

Enamel Foreman - In charge of 5 employees on a 40 hour per week day - work basis. This group has the basic function of laminating blotting paper to book paper and forming our old familiar desk blotters. This was once a very large operation. Today this only occupies about 50% of their time, the remainder being devoted to acting in a capacity as a secondary finishing operation. There is a small amount

of time used for making embossed blotting.

To further clarify mill operations we will list the job classifications (hourly roll) and major pieces of equipment associated with each group.

Machine Room			Hourly Rate
Employees	Machine Tenders	4	$ 2.10½*
	Back Tenders	3	1.94
	3rd Hands	4	1.72
	4th Hands	3	1.63½
	5th Hands	3½	1 .63½

Equipment One 00" trim fourdrinier paper machine. One suction press, one flat press. 24 - 36" steam dryers, 4 - 40" felt dryers. One 5 nip calender press, one 5 spool reel. One machine winder, one machine cutter. One core cutter. Oil fired boiler, steam turbine. One lift truck. Conventional auxiliary equipment, such as jordans (3), machine, beater and white water chests, platform scales and necessary Foxboro control devices.

Beater Room			Hourly Rate
Employees	Beatermen	4	$ 1.72
	Dumpers	3	1.63
	Helpers	3½	1.56

Equipment Three 900 pound floor beaters, Hollander type. Necessary stock lines, blender chests and control devices. Large areas for pulp, dye, and additive storage. Scales for dyes, additives.

*All employees on a 40 hour week are paid for 52 hours. Employees on shift work are paid a differential of $.04 per hour for the second shift and $.08 for the third shift.

Finishing and Shipping			Hourly Rate
Employees	Re-Winderman	2	$ 1.63½
	Trimmers	3	1.63½
	Finishers	2	1.56
	Shippers	4	1.63½
	Truck Driver	1	1.59

Equipment One Cameron rewinder, one Seybold trimmer, one large platform scales, auxiliary wrapping equipment, one dummy hoist, one over-the-road truck, large areas for the storage of finished and semi-finished paper. 4 loading points.

Yard			Hourly Rate
Employees	Lift truck driver	1	$ 1.62
	Lead man	1	1.62
	Helpers	3	1.56

Equipment One heavy duty lift truck, two electric work savers, three large elevators, one platform scales. Large areas for the storage of various grades of pulp and broke.

Enamel			Hourly Rate
Employees	Paster operator	1	$ 1.92
	Sheeter Operator	1	1.66½
	Trimmer Man	1	1.66½
	Finisher	1	1.70½
	Bander	1	1.53½

Equipment One paster machine, one sheeter, one trimmer, two embossing machines. Counting and packaging tables and necessary auxiliary equipment.

The foregoing should give us a fairly composite picture of mill functions and operations, with the exceptions of a few essential vital statistics, which we will detail below. It should be noted that the organization as used and that detailed by company management are at variance where felt necessary by mill management. This point is true in most industrial organizations but bears repeating.

Vital Mill Statistics:

Tonnage capacities, per 24 hour day - varies from 20,000# to 75,000# depending upon grades and product mix.

Tonnage capacities, per 168 hour week - again varies due to mix, but will normally fluctuate between 230,000# and 375,000#.

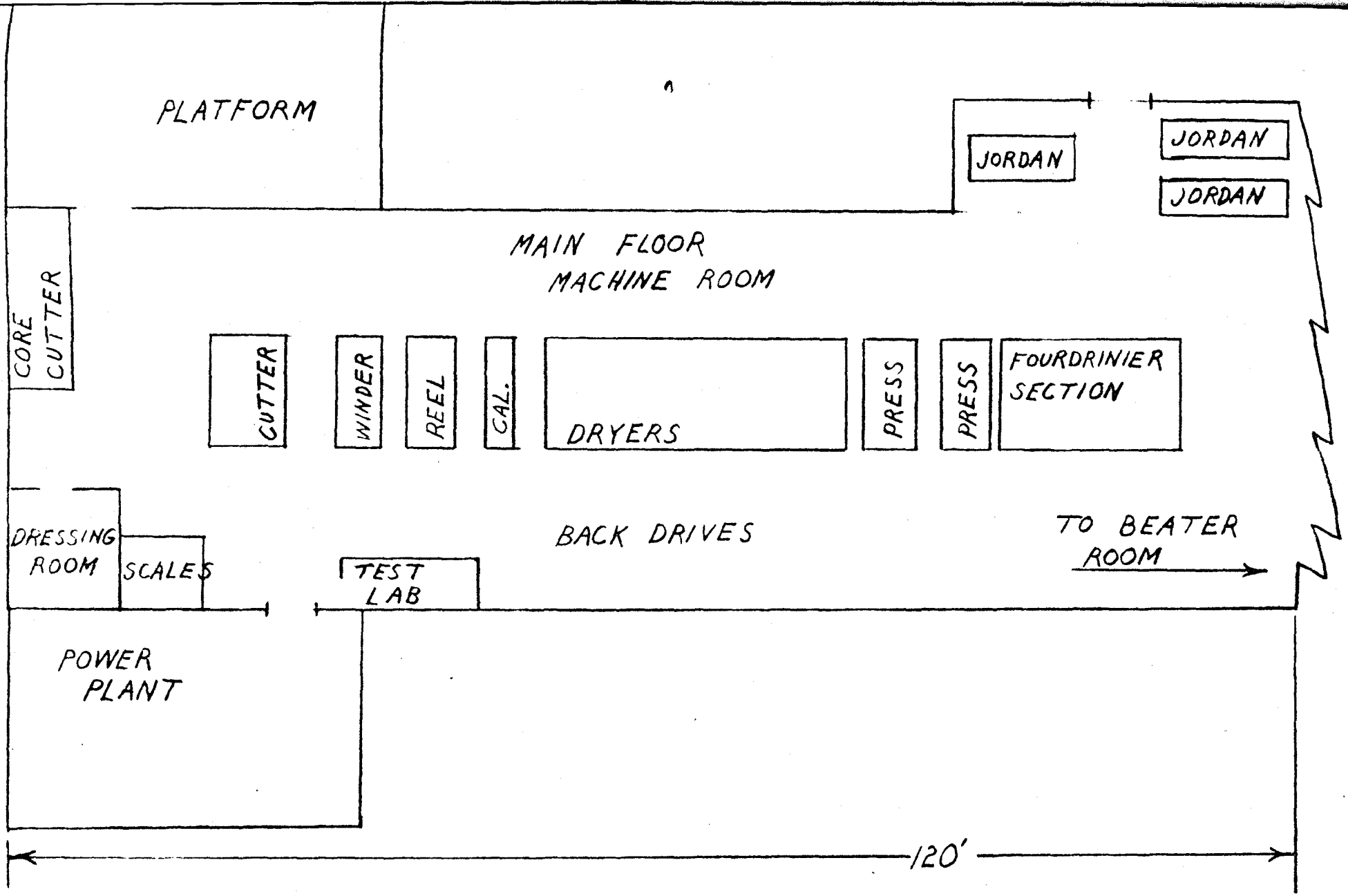
Shipping capacities, same as manufacturing capacity. Can vary almost any percentage between truck and rail shipments.

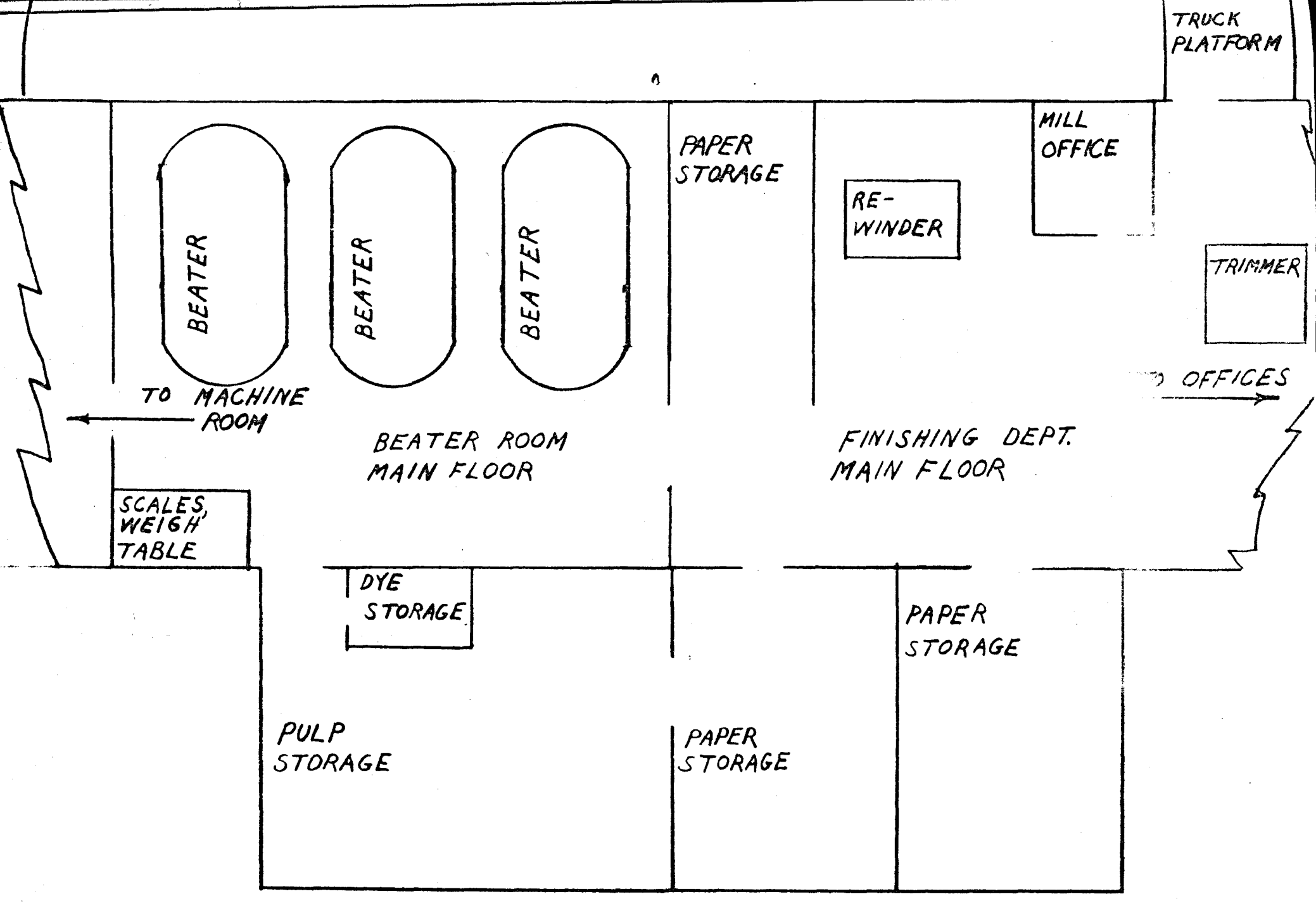
Finishing Capacity - 93,000# per week on a normal product mix.

Enamel Capacity - 40,000# per week

The reader should now be versed enough in company background and basic mill operations for a presentation of present, changing and proposed cost controls. These will be presented in our next chapter on an as-is basis, meaning that we are not using them in conjunction with the ever changing capital addition structure.

Following are two sketches showing the layout of the main, or machine room floor. The Mill extends one floor below and two above this plan view.


PLATFORM
JORDAN
JORDAN
JORDAN
MAIN FLOOR
MACHINE ROOM
CORE CUTTER
CUTTER
WINDER
REEL
CAL.
DRYERS
PRESS
PRESS
FOURDRINIER SECTION
DRESSING ROOM
SCALES
TEST LAB
BACK DRIVES
TO BEATER ROOM
POWER PLANT
120'


TRUCK PLATFORM
BEATER
BEATER
BEATER
PAPER STORAGE
MILL OFFICE
RE-WINDER
TRIMMER
TO MACHINE ROOM
OFFICES
BEATER ROOM MAIN FLOOR
FINISHING DEPT. MAIN FLOOR
SCALES, WEIGH TABLE
DYE STORAGE
PAPER STORAGE
PULP STORAGE
PAPER STORAGE

Chapter III

BUDGETED COSTS AND THE PROFIT AND LOSS STATEMENT; ESTABLISHING PROPER COST CONTROL

Although Mill Supervision receives many published statements from the Financial Department regarding costs, three are of prime importance, as follows:

1. Period Cost Statement - Actual versus planned costs.
2. Weekly Profit and Loss Statement - Based on net production.
3. Period Profit and Loss Statement - Based on net sales.

As with most accounting data, these records are for the large part historical and issued after the fact. Although such records are normally no criterion of what future performances should be, said records do furnish a good steering point and help chart the future course of action.[1]

There are a number of supporting documents, of lesser overall value, but necessary to present the whole picture. Among these are the following:

1. Comparison of Reported and Computed Production - by period.
2. Demurrage Costs.
3. Customer Complaint Costs - Expressed in dollars and percentage of gross sales.

1. Henrici, Stanley B., Standard Costs for Manufacturing (Second Edition, McGraw-Hill Book Co., Inc., New York, 1953), p. 109

4. Status - Capital additions.

5. Division Profit and Loss Statement.

The above is merely a sampling and intended only to portray that the reporting method can be considered somewhat complete. No attempt will be made to present these supporting documents, however, since it is felt they would not basically add to the thesis content.

It should be mentioned at this point that the Company and all of its subsidiary divisions operate on a 13 period year, each period covering four weeks. Albemarle operates on a fiscal year, normally beginning around the 1st of April and ending on approximately March 31st.

It is the author's intent to cover two basic topics in this chapter -- The present accounting reporting method and the Mill Cost Control program. This control program, as such, was begun about two years ago and was and is designed for internal (Mill) costing, providing methods and checks which will best obtain the desired goals of optimum production and quality which will, in the long run, maximize profits. Standard costs per se are not utilized, but the basic concept is, namely, determining what costs should be, for both itemized expense and inventory valuation.[2] Part of the reason for not using standard costs wholly is their debatable nature, as regards whether or not they are true costs.[3] The second reason is the enormous amount of work of a clerical nature involved in setting and keeping current standard costs. The second reason can be considered somewhat debatable, but we are talking about a finite rather than a loose system. In one sense of definition we do have a system of standard costs, which are more nearly "rule-of-thumb" guides than they are exacting costs.

2. Ibid., p. 34.

3. Ibid., p. 160.

Budgeting as such is a fairly recent innovation within the company, being put on a formalized basis only within the past five years. The Budget Department has increased in size and usefulness along with Albemarle, and the idea of dynamic budgeting being used as a tool of control and planning for management use has been fully utilized or an attempt made at full utilization.

Before delving further into our present system we will present our three control documents considered most important, coupled with necessary discussion. The weekly Profit and Loss Statement, it must be remembered, is based on production and not sales. This statement is based on production since much of the stock tonnage made will not be sold for weeks or months after the date of manufacture. The additional tonnage is sold as it is made, of course. Although Sales is theoretically responsible for profits, this responsibility is actually a joint venture due to production's role in cost reduction. This statement is prepared by the Accounting Department and issued generally about a week after the week closes, the week running from 7:00 A. M. to 7:00 A. M. on Mondays. Much of the tonnage produced, particularly that for stock inventory, is not sold for weeks and months after being made. Consequently many prices estimated at the time are later subject to the variations in the market, which can and do fluctuate in either direction. In essence it can be said that all weekly Profit and Loss Statements, when summarized, will not equal the yearly profit or loss. The two figures are fairly close, however, due to compensating factors over the duration of a fiscal year. Basically this statement serves as a guide for production management and the Sales Department. Like any other such statement, its usefulness is limited to the skill and ability of the executives who use it for control purposes.[5] By following the statement week-by-week trends can be established, especially on those items which are repeated in manufacture at fairly regular intervals.

4. Welsh, Glenn A., Budgeting: Profit-Planning and Control, (Prentice-Hall, Inc., 1957) p. V.

5. Henrici, op. cit., p. 185.

The week presented can be considered typical. Before presentation several points should fully clarify all data shown.

Quantity - Net poundage after all waste.

Cost of Finishing - Shown only for items subject to further operations after manufacture, such as rewinding or trimming.

Conversion Cost Per Ton - Cost required to convert raw materials to finished paper, excluding cost of raw material.

Data presented on this statement is obtained from various Mill and Sales records.

HOLLYWOOD MILL
PROFIT BY PRODUCTS AND CUSTOMERS
For the Week Ending April 17, 1960

Customer	Lot Number	Product	Quantity	Sales Value per cwt.	Total Sales Value	Total Cost	Profit or (Loss) Per Ton	Profit or (Loss) Total	Total Cost of Finishing	Conversion Cost Per Ton
i Dominion Paper	4478	80# Kraft Drawing	43 600	$ 14.60	$ 6 374	$ 6 618	$(11.20)	$ (244)	$1 308	$ 85.37
nnel Department	4479	42#, 103# White Rolls	36 710	13.00	4 772	4 003	41.90	769	-0-	48.38
k and Orders	4480	100-120# White Verigood	18 153	16.17	2 934	2 382	60.82	552	545	48.26
nnel Department	4481	42#-103# Pink Rolls	4 775	13.51	645	566	33.08	79	-0-	53.60
P. Andrews	4482	100# Lt. Green Verigood	12 237	12.97	1 587	1 629	(6.88)	(42)	367	49.53
k Paper Company	4483	100# Dk. Gray Verigood	9 957	17.75	1 765	1 463	60.67	302	299	49.22
B. Harris Company	4484	80# Dk. Blue Verigood	2 638	8.75	230	410	(136.47)	(180)	79	62.17
ck	4485	100# Choc. Verigood	8 924	16.00	1 428	1 235	43.25	193	268	56.25
ymond Bag	4486	80# Brown Crepe	8 565	14.72	1 261	1 354	(21.71)	(93)	218	88.49
t Products	4487	155-180-430# Brown Gasket	38 087	12.96	4 936	4 261	35.44	675	970	77.19
board Mfg.	4488	70# Nat. Crepe Sack	53 415	11.00	5 876	4 374	56.24	1 502	-0-	79.71
board Mfg.	4489	50# White Kraft Sack	33 850	12.75	4 316	3 664	38.52	652	-0-	65.47
B. I. Printing										
board Mfg.	4490	50# No. 5 Yellow Sack	41 825	14.25	5 960	4 460	71.74	1 500	-0-	72.83
B. I. Printing										
. Printing	4491	60# Alb. Green Wrp.	3 125	8.25	258	293	(22.41)	(35)	-0-	78.10
		Total	315 858		$42 342	$36 712	$ 35.65	$5 630	$3 954	

The second major statement that we are concerned with is our period profit and loss recapitulation. It will be noted that this is not broken down by product and is not in great detail. It does, however, reveal our net income (Before Taxes) for a four week period, based on net sales. Both period and cumulative year-to-date figures are shown; this statement is normally completed and released about two weeks after the period closes. Since there is no noticeable seasonal trend the one detailed can be considered typical. The only noticeable exceptions are the two periods in which the maintenance and Christmas shut-downs occur (October and December). In these two periods the natural tendencies are towards higher costs, coupled with lower production and profits.

Hollywood Mill Profit and Loss

For Period Ending September 10, 1960

	Total Cost	Per Ton Cost
Net Sales	$ 155,900	$ 294
Cost of Sales	129,699	245
Gross Profit	$ 26,201	$ 50
Expenses	5,799	11
Net Profits	$ 20,402	$ 39
% Profit on Net Sales	13.1%	

April 1, 1960-September 10, 1960 Cumulative

Net Sales	$ 891,336	$ 271
Cost of Sales	777,607	236
Gross Profit	$ 114,249	$ 35
Expenses	30,751	9
Net Profit	$ 83,498	$ 25
% Profit on Net Sales	9.4%	

Source: Hollywood Mill Period Profit and Loss Statements

The preceding statement, figures therein and captions are obviously self-explanatory. Such a summarized Profit and Loss Statement loses a great deal of its effect since the aspects of the product mix are lost. This effect is not important in our large single product kraft mills but does become misconstrued in our specialty operation. It is hoped that the near future will find this rectified with the addition of a product break-down to the Hollywood statement.

Our third major statement, and most important as well as most useful for Mill operations, is the Period Cost Statement. For our purposes we will detail only two segments of this statement -- paper mill operations and paper mill statistics.

The following documents are also available, however:

1. Finishing Costs
2. Coating (Enameling) Costs
3. Coating Statistics
4. Auto and Truck Costs (Burden Distribution)
5. Power Plant Costs
6. Power Plant Statistics
7. Shipping Costs
8. Burden Costs (Over Head Distribution)
9. Technical Division Costs (Burden Distribution)

We will first present a typical period statement as regards paper mill operations and statistics, before showing any necessary analysis.

PAPER MILL OPERATING STATEMENT, PERIOD ENDING JUNE 27, 1960

Item	Total Cost Actual	Total Cost Planned	Per Ton Cost Actual	Per Ton Cost Planned	Year-to-Date
Materials:					
Halifax Pulp	$19,174	$22,346	$ 33.06	$ 38.53	$ 30.54
Other Pulp	33,628	33,116	57.36	57.10	66.56
Mill Broke	6,664	934	11.49	1.61	7.40
Cotton Linters	4,404	6,502	7.59	11.35	9.96
Misc. Chemicals	237	389	.41	.67	.58
Colors, Sizes	7,020	5,631	13.50	9.71	11.04
Alum, Clay	1,147	991	1.98	1.71	1.94
Finishing Materials	334	470	.58	.01	.97
Total Materials:	$73,058	$70,459	$125.97	$121.49	$128.99
Conversion Costs:					
Utilities & Clothing Demurrage	$ 100	$ 135	$ .17	$ .23	$ .11
City Water, Steam	5,616	7,677	9.68	13.23	10.04
Electricity	3,447	3,233	5.94	5.57	5.34
Wires, Felts	1,784	1,784	4.07	4.07	4.05
Total Utilities & Clothing:	$10,947	$12,829	$ 18.88	$ 22.12	$ 18.54
Labor:					
Beater Room	$ 4,539	$ 4,424	$ 7.83	$ 7.63	$ 7.63
Machine Room	6,560	7,000	11.31	12.07	11.52
Vacation, Taxes, Insurance	922	337	1.61	1.92	2.05
Pulp Handling	626	1,329	1.08	.95	.95
Total Labor:	$ 12,657	$13,090	$ 21.82	$ 22.57	$ 21.77
Maintenance:					
Repair Materials	$ 3,428	$ 2,400	$ 5.91	$ 4.14	$ 5.27
Repair Labor	2,685	2,726	4.63	4.70	4.45
Total Maintenance:	$ 6,113	$ 5,126	$ 10.54	$ 8.84	$ 9.71
Overhead:					
Mill Burden	$10,930	$10,415	$ 18.83	$17.96	$ 18.22
Depreciation	694	643	1.20	1.11	1.19
Experimental Costs	-	(88)	-	(.08)	-
Total Overhead:	$11,624	$11,095	$ 20.04	$ 19.13	$ 19.41
Total Conversion:	$ 41,341	$42,140	$ 71.20	$ 72.66	$ 69.44
Total Costs:	$114,401	$112,599	$197.26	$194.15	$198.42

Source: Hollywood Mill Period Cost Statements

PAPER MILL OPERATING STATISTICS, PERIOD ENDING JUNE 27, 1960

Production	Period Actual	Period Planned	Year-To-Date Actual	Year-To-Date Planned
Paper Produced - Tons	580	546	1,170	1,097
Operating Hours	672	672	1,344	1,344
Production Per Operating Hour	.86 T.	.81 T.	.87 T.	.81 T.
Lost Time Hours	60.5	60	123.1	120
Productive Hours	611.5	612	1,220.5	1,224
Production Per Productive Hour	.95 T.	.9 T.	.96 T.	.9 T.
Operating Cost Per Operating Hour	$61.50		$ 60.46	
Operating Cost Per Running Hour	$67.63		$ 66.58	
Fibre Loss	6.81%	6%	7.59%	6%

Material Usage

	Used	Avg. Price	Per Ton Period Actual	Per Ton Period Planned	Per Ton Year-To-Date Actual	Per Ton Year-To-Date Planned
Halifax Pulp	275.9	$ 70.10	.40	.54	.44	.54
Other Pulp	247.6	134.39	.43	.44	.50	.44
Mill Broke	98.9	83.10	.14	.03	.10	.03
Linters	18.9	234.17	.03	.05	.04	.05

Labor

	Avg. Hrly. Rate	Man Hours Period Actual	Man Hours Period Planned	Man Hours Year-To-Date Actual	Man Hours Year-To-Date Planned
Beater Room	$ 1.74	2,609	2,524	5,140	5,050
Machine Room	1.96	3,345	3,550	6,040	7,090
Pulp Handling	1.70	367	325	704	651

Utilities

	Used	Avg. Cost	Per Ton Period Actual	Per Ton Period Planned	Per Ton Year-To-Date Actual	Per Ton Year-To-Date Planned
City Water (1000 Gals.)	3,700	$ .14	$ 6.30	$ 10.61	$ 8.27	$ 10.64
Steam (1000 Lbs.)	5,205	.99	8.99	14.15	9.40	14.16
Electricity (1000 KWH)	261	13.60	.41	.47	.46	.40

Source: Hollywood Mill Period Cost Statement

The planned costs shown on page 29 are not actually standard costs, but are rather merely the total estimated usage or consumption for the entire year, divided by 13 to obtain the period costs. Inventory valuation, derived from these actual costs, would probably be better evaluated on the predicted sales prices, which are normally very close, or at least on prices less profit. This is admittedly a weak point of the Operating Statement. The primary reason for some of the variances between planned and actual is the radical sales mix. This mix is estimated very well for the year, but sometimes fluctuates violently on a period basis. This is particularly true of Utilities, as shown on page 30. Water, steam and electricity consumption vary considerably with the type of tonnage being run.

These two statements are of course somewhat typical of budgeted data -- Each cost sheet backed up by a summary of operating statistics. Basically formulation of the fiscal year's operating budget is begun about two months before the first day of the year, i. e. start preparation on February 1 for April 1. The Budget Department furnishes the various work sheets to the Plant Superintendent, coupled with the Sales Department annual forecast. This forecast, incidentally, is broken down by products but not by periods. The Plant Superintendent works with the Service Manager, accounting and budgeting in preparing estimates for the coming year, based on the sales forecast. Year-to-date costs and costs of previous years are used as historical guides, coupled with what knowledge there is of changes to be made in the forthcoming year, such as major pieces of capital equipment which could change the production rate.

The Plant Superintendent, working with his operating supervision, attempts to complete the budget about two weeks before the beginning of the fiscal year. It is then subject to review and approval of the paper making Group Manager, Division Manager and Budget Director before being put into effect. The system, which as previously mentioned has been in use only a few years, has been justified by its great service to management.[6] The three basic control objectives of performance, coordination and loss minimumization are being better met as time and action progress.[7] There is a constant effort being made to set up and improve the various accounts, as regards their relation to managerial responsibility. This is particularly true as it pertains to the burden accounts.[8]

6. Welsch, op. cit., p. 5.

7. Ibid., p. 9.

8. Ibid., p. 25.

Every attempt is made in budget formulation to bring all levels of supervision "into the act", from Division Manager to first line foremen. This attitude has probably been the largest single factor in any success that has resulted.[9 & 10] By the same token there is an increasing tendency for each supervisor concerned to receive a copy of all budgeted data pertaining to his department.[11]

The budget as set is not an inflexible one, and can be changed during the year to reflect wage changes, changes in supervisory salaries, and other such costs that it is realized may occur but are difficult to estimate.[12]

During the course of the year variance reports, reflecting major differences between actual and planned costs, are submitted by the Budget Department to Mill Supervision. Such reports are becoming less frequent, not necessarily because of closer adherence to planned costs, but because supervision itself now has more know-how as to how to conform when costs fluctuate.[13] Probably a better statement would be that all variances are incorporated into a single period report, handled in a concise manner, rather than in many loose variance reports. This manner of reporting is now a credit to both Budgeting and operating supervision.

9. Sord, Burnard, H. and Glen A. Welsch, Business Budgeting - A Survey of Management Planning and Control Practices (Controllership Foundation, Inc., 1958) p. 36.

10. Ibid., p. 107.

11. Ibid., p. 115.

12. Ibid., p. 270.

13. Henrici, op. cit., p. 182.

There is one major difficulty with our operating budget as now used, however. This is the fact that the tremendous product mix manufactured is not, or very poorly reflected in cost data. While not needed in a large kraft mill making one or several standard products, it becomes almost a must in the specialty mill, which can be considered the "job lot shop" of the industry. Literally hundreds of varying products are made at Hollywood Mill, with almost as much variation in costs and profits. Such a sales mixture is desirable in this case, but management should know its exact effect on the profit and loss statement.[14]

At this point we can recapitulate on the previous chapters and material before delving into our basic proposals. We have reviewed Albemarle history from a broad porspective, Hollywood Mill from a specific one. The reader should now be somewhat familiar with the Mill, its organization, its aims and its cost structure. Both strong points and weak links have been noted in our budgeting and costing procedures.

The remainder, and major part of the thesis, will be devoted to the internal cost control and budgeting system, either recently put into effect or being installed, or that which is proposed. This program has been originated and installed (Or being installed) by the Hollywood Mill Superintendent (Thesis author) with the assistance of his staff. The need for the various proposals or installations will be detailed as each is described. The program in its entirety will be summarized in the final chapter.

The foregoing is not meant to intend that part of the foregoing part of the thesis is not original in scope -- It is -- It is only intended to separate partial from complete originality, admittedly a difficult boundary to establish.

14. Rautenstrauch, Walter and Raymond Villers, Budgetary Control (Funk and Wagnalls Company, New York, 1950), p. 165.

A way must be found to reflect both costs and profit by product, and reflect both correctly in their respective statements. As a consequence, our thinking is directed along a basic three-pronged attack:

1. Establishment of proper controls.
2. Budget all products on an individual or grouping basis. Obviously Item #1 must be established, or in the process, before Item #2 can have meaning.
3. Incorporate product budgeting into cost statements and profit and loss statements.

We will begin our planning in logical sequence, starting with Item #1. Throughout we will keep in mind the control purposes of standardizing, comparing, finding the variance, and correcting it, in essence.[15]

The various controls which will be described and detailed are not necessarily designed to control one area of cost in most cases. Rather they are intended to assist in the overall goal of producing a lot of quality paper and sell it at a profit. It is also to be remembered that the various forms in use are not an end in themselves, but are used only to the extent that they succeed in increasing tonnage and reducing costs. Many others have been tried and found wanting, but the ones that remain have met this test. Standards as set have been put in on a piece-meal basis, and such is still done, rather than attempting to complete any set before attempting

15. Heckert, V. Brooks and James D. Willson, Business Budgeting and Control, (Second Edition, The Ronald Press Co., New York, 1955), p. 11.

their use.[16] This is desirable since they are at best in a constant state of flux due to changing conditions and methods.

All controls shown have been put into effect in approximately the past two years; this process is continuous and the work will proceed into the future. It must be understood, however, that at present the bulk of the initial work has been completed and future work will consist largely of modifying and keeping up-to-date that already in use.

A New Concept-Cost Control

Scheduling:

Formerly the Mill production schedules were largely determined by the Sales Department; Naturally Sales thinking is based primarily on the basic goal of meeting shipping dates and the customers required delivery. Such a scheduling method was satisfactory for our large kraft machines, where orders rarely changed in basic make-up, but such a method was of little use in the specialty mill. This method was largely allowed to remain as is at Hollywood for a long while merely because the difference was not noted or thought to be of consequence, admittedly ~~by~~ a rash but true statement. This is good unto itself, but other factors must be considered, among them:

1. Availability of pulp and other raw materials. Since we are delving into specialty products, a large amount of raw materials must be kept on inventory with relation to production.
2. Logical sequence on the paper machine. This sequence is primarily directed towards reducing overtime and is accomplished by combining similar products and color runs.
3. Tie-in of paper machine schedule with finishing schedule. This is only apropos, of course, when finishing is necessary, since some products are shipped direct.

16. Henrici, op. cit., p. 147.

4. Need for stock inventory. Many customer shipments can be made along with needed stock inventory. A large inventory is maintained largely for blotting shipments. Although total blotting sales are large, most orders consist of from 100# to 1000#, impossible to make as such economically on the paper machine.

As a result of the above a bi-weekly meeting is now held aimed at meeting all of the above goals. This is attended by the Mill Sales Coordinator, Mill Superintendent, Technical and Assistant Superintendents, and the Finishing Foreman. Changes and additions are made as required and the schedule is put into effect, as shown. The stock section consists of needed inventory that will be slotted into the schedule when a logical spot occurs.

HOLLYWOOD MILL
PAPER MACHINE SCHEDULE

Beginning Date: 1/7/61

nnage	Product	Customer	Order Number
,000	70# Natural Crepe	Raymond, Stock	791
,000	50# White Sack	Seaboard	1260
,000	100,120# White V. G.	Stock	-
,000	83# Lt. Blue Rolls	Enamel Dept.	-
,000	100# Lt. Blue V. G.	J. B. Harris	812
,000	120# Dark Blue V. G.	Stock	-
,000	Moss Green V. G.	Gen. Service Admin.	1310
,000	50# Red Cover	Carter-Rice	1110
,000	80# Red Crepe	Stock	-
,000	110# Black Crepe	Arkell	1060

STOCK:

nnage	Product	Department
,000	100# Canary V. G.	Finishing
00	200# Choc. Embossing	Enameling
,000	63# Pink Rolls	Enameling
,000	100# White World Blotting	Finishing

As a second step a Finishing schedule, consisting of rewinding and trimming orders, is published weekly. Since we know that we can produce about 1,000# per operating hour on each trimming and rewinding, based on an average product mix, the schedule is set up accordingly. Approximately 40,000# can be made with each unit, as mentioned above; More will result in overtime, loss in scheduling the employees on odd jobs or laying them off.

This schedule is somewhat of a follow-up on the paper machine schedule, except that some items can be drawn from semi-finished goods already in inventory. It is made up by a combination of the thinking and requirements of Sales and Mill Finishing supervision.

HOLLYWOOD MILL
Rewinding and Trimming Schedule
Week Beginning 1/9/61

REWINDING

CUSTOMER	PRODUCT	ORDER NO.	QUANTITY
Raymond	90# Crepe	1030	20,000
Cont. Can	Matrix	1040	15,000
American Flange	Matrix	507	5,000
Seaboard	70# Crepe	510	5,000
Printing	Blue Crepe	Stock	5,000
		TOTAL	50,000

TRIMMING

CUSTOMER	PRODUCT	ORDER NO.	QUANTITY
G. P. O.	White Blotting	970	15,000
Whitaker	Wrapping	620	10,000
Millhour	File Backing	1115	15,000
Finishing	Blue Blotting	Stock	5,000
Ditto	White Blotting	061	1,000
		TOTAL	46,000

Copies to: A. W. Oakes
C. M. Powell
L. D. Hogge

Production Trends

A series of production trends reflecting various data on the paper machine operation is kept by the Mill Clerk in report form, and distributed to all production supervision. This report considers only very significant items and is not in great detail, necessary detail being reflected in the cost statement.

By the use and interpretation of it, however, harmful or poor trends can be quickly investigated. The information is easily graphed and portrays at a quick glance major operations. This, like other controls tabulated, is primarily intended for internal use, where corrections can be made at the source, before getting out of line.

Two examples should suffice to explain the use of these trends, which are actually put into graphical and tabular form and compared period by period. Average order length, for instances, varies inversely with costs -- If it climbs it should tend to reduce our total manufacturing costs. Fibre loss varies directly with costs -- A reduction in this loss should tend to reduce our costs. Data on this trend sheet rarely appears in other reports, and never accumulated as we have done here.

Period Production Data, Period Ending 11/13/60

1.	Tonnage Produced	602.3
2.	Average basis weight	156.8
3.	Average order length	16,993
4.	Down time hours	
	a. Wire change	4.17
	b. Before or after wire change	0
	c. Grease ups	2.50
	d. Miscellaneous	4.00
	e. Change product, wash ups	37.00
	f. Felt change	1.33
	g. Equipment failures	5.67 (7)
	Total Down Time	54.04
	% Down Time	8.2%
5.	Fibre loss	6.6%
6.	Average paper machine speed	105.9
7.	Total broke	106,779
	Broke as % of gross	8.3%
8.	Man-hours per ton	
	By hours worked	13.9
	By hours paid	15.4

Converting Trends

A weekly report is submitted by each of the Mill's two converting departments, Finishing and Shipping, and Coating, to the Mill Superintendent. These reports contain basically all of the production operations that took place in the respective departments during the week, and are issued immediately following the week's close.

Many trends can be established, followed, and corrected if necessary, by their use. Among these are:

1. Production loads on equipment.
2. Methods of packaging.
3. Waste - Normal or Abnormal?
4. Man power - Satisfactory, or too little or too much?
5. Shipping - Balanced between trucking and rail, or tending to go in one direction?

Both reports, which follow, are considered self-explanatory.

A knowledge of machine production capabilities serves as a gauge of weekly trends. For example, on a normal product mix we should obtain 1000# per hour, or 40,000# per week on our Langston (Rewinder). A variation from this means one of several things,-- Poor efficiency (Or good), lack of orders, or a large order back-log. In any event reasons for these variations are known, closely followed, and corrective action taken when and if needed.

HOLLYWOOD MILL

Finishing and Shipping Production Report W. E. 1/20/61

Finishing

	Langston	Cameron	Trimmer	Total	Broke	% Broke
on.	6,320	Down	8,110	14,410	1,510	10
ues.	6,395		12,665	19,660	2,015	10
ed.	4,660		13,755	18,415	1,900	10
hurs.	4,475		11,000	15,475	1,625	11
ri.	5,110		12,440	17,550	1,695	12
at.	2,300		7,515	9,015	600	6
otal	29,260		65,485	94,745	9,345	10

Packaging

	Wrap and Cap	Cartons	Bundles	Pallets or Skids	Total
on.	6,980	8,100	None	12,400	27,480
ues.		6,390		16,390	22,780
ed.	12,400	8,100		8,440	28,940
hurs.	7,490	5,610		5,800	18,900
ri.	15,115	3,395		4,420	22,930
at.				34,600	34,600
otal	41,985	31,605		82,050	155,640

Shipping

	Truck	Car	Total
on.	110,083		110,083
ues.	19,338		19,338
ed.	58,097	42,646	100,743
hurs.	11,441		11,441
ri.	34,776	39,666	74,442
at.			
otal	233,735	82,312	316,047

HOLLYWOOD MILL

Coating Department Production Report

W. E. 1/15/61

Coating

	Paster		Sheeter		Trimming		Packing		Broke	% Broke
	Prod.	Hrs	Prod.	Hrs	Prod.	Hrs	Prod.	Hrs		
Mon.			8,100	8	8,100	8	16,200	8	1,000	6
Tues.			8,748	8	8,740	8	17,496	8	2,000	11
Wed.	8,644	8								
Thurs.	6,440	5	2,916	3	2,916	3	5,832	3	580	10
Fri.			9,558	8	9,558	8	19,116	8	1,900	10
Sat.										
Total	15,084	13	29,322	27	29,322	27	58,644	27	5,480	9

Other Operations

	Trimming		Embossing		Sheeter		Packing	Salvage
	Prod.	Hours	Prod.	Hours	Prod.	Hours		
Mon.							5,380	
Tues.	810	1	810	2			3,800	
Wed.	550	1	550	2			10,500	
Thurs.	550	1	610	2			5,040	
Fri.							4,050	
Sat.								
Total	1,910	3	1,970	6			30,370	

Machine Clothing

The most important attribute of a paper machine is the rate at which it can dry or produce quality tonnage. In its very simplest terms paper making consists of adding, percentage-wise, a lot of water to a small amount of pulp, and then changing this by drying to a lot of paper and little water. From start to finish the essential ingredients are:

	Water	Pulp Fibres
Raw Material	95%	5%
Finished Paper	5%	95%

The Fourdrinier wire and the press and dryer felts transport and help form the paper as it progresses from the paper machine head box to the reel. Wires and felts are expensive, as is the cost of down time for replacing them. Their most important factor, however, is not their initial cost but their unit cost per pound or ton of paper.

Consequently we must strike a happy medium. Felts and wires must be kept on the machine a reasonable length of time, but not so long as to hamper the formation and drying rate of the paper. Desirable time elements were set for this by going through records of past years, and the time reduced until a happy medium was struck. A schedule was established, which is changed each time one of the units is changed, rather than "guesstimating", as had been done in the past.

Since a paper machine is like a steel rolling mill in the sense that it has not one machine, but a number of them in series, all units cannot be changed at once; In fact the useful life of the units varies.

The following times were eventually set as standards:

Wire	35 Days
1st Felt	30 Days
2nd Felt	40 Days
Top Dryer Felt	60 Days
Bottom Dryer Felt	70 Days

Days established are not followed exactly whenever other down-time is anticipated; Down time for the various units varies from one half to five hours. Units are combined with other units when the established dates are close, or are scheduled with other planned maintenance. In other words, as many possible and necessary changes are combined into one, every time the paper machine has to be shut-down, the longest one time being set as the limiting factor.

Wire and Felt Record

	Date Put On	Change
Wire	1/31/61	3/6/61
1st Felt	1/12/61	2/12/61
2nd Felt	1/29/61	3/9/61
Top Dryer Felt	1/3/61	3/3/61
Botton Dryer Felt	12/6/60	2/14/61

Summary

We will continue our discussion of internal cost control and methods in the next chapter. It will be noted that most of these controls supplement basic cost accounting rather than supplant them. Furthermore most are directed at reducing conversion costs (30-40% of total) rather than material costs (60-70% of total) since operating supervision has

only slight control over material costs, which are primarily dictated by the Sales mix. More will be said about this facet later.

Internal controls are not necessarily selected in the order of their significance in these chapters, but rather in their manner of need or logical use, since all are on a continuing basis.

Chapter IV

Cost Control - A Continuation

In this chapter we will continue our study of supplementary cost control, begun in Chapter III.

The machine room and beater room, which as noted before operate around the clock, have no salaried supervision at night and over a large part of the weekend. The machine tender, top man on the hourly roll, acts as a working group leader during these time periods. He can and will call supervision when needed, but normally handles all phases of the paper making operation himself. The beater man and his crew report to the machine tender, as does the rest of the paper machine crew.

A brief entry log has been devised and is kept, around the clock. On this the machine tenders record speeds, products run, and any occurence on their shift of an unusual nature. These would be such items as mechanical failures, variation in color or basis weight, excessive down time, and anything else that deters from the objective of producing as much high quality tonnage as possible. The prime purpose of this log, of course, is to keep a running record of performance, whether supervision is present or not. The entries are reviewed each day, for conformance to product speed and correction of mechanical or other failures. These sheets are kept on file and serve to present trends when any piece of equipment continually creates problems.

A representative machine tenders log follows. Note that there are three machine tenders making entries on this particular day, which is normal.

DATE: 1/20/61

HOLLYWOOD MACHINE TENDER'S LOG

TIME	PRODUCT	SPEED	COMMENTS
00 AM	50# Sack	340	7 - 3 M.T. W. E. S.
00	"	"	Check wet streaks in top dryer felt.
00	"	"	Beater chest stock pump sluggish and not pumping stock fast enough at 9:30
00	"	"	
00	"	"	
00	"	"	
00 PM	60# Sack	320	
00	"	"	
00	"	"	3 - 11 M.T. E. R. T.
00	"	"	Had to send 500# of crepe back to beaters due to mixture with sack fibres.
00	"	"	
00	80# Crepe	210	
00	"	"	
00	"	"	
00	"	"	
00	90# Crepe	170	
00	"	"	11 - 7 M.T. R. H. P.
00	"	"	Good run. Shut down at 6:30 to start wash-up ahead of white crepe.
00 AM	"	"	
00	"	"	
00	"	"	
00	"	"	
00	"	"	
00	Wash Up Machine		

Inventory Control

A very large inventory, in relation to production, is maintained in the Mill at all times. Between 500,000 and 1,000,000# of finished and semi-finished paper is stocked, whereas 300,000# is considered a good production week. This stock is in addition to the direct shipments that are moving from the paper machine every day. Some of the stock is shipped as is, while other is further finished as to size, packing or other specifications, depending completely upon customer requirements.

Most stock runs are handled on the paper machine in conjunction with direct shipments. Large lots are due to desirable set-up costs, for we must be able to sell the product at a price that can be met by our customers who want an order of average size in the future.[1] Very obviously our price setting should be directed towards profit maximization in the long as well as the short run. Long run profits depend in large part to our control over price, which in turn depend upon the competitive market.[2] It is true that it is difficult to maximize both long and short range profits, but we aim for this goal by attempting to sell more specialties and less kraft on a continuing basis. This means that we are increasing our short range profits and laying the ground work for future long range profit potential.

The competitive market is taken into account originally when the sales forecast is prepared prior to the budget period. With consideration for the Mill's internal costs, it is fully realized that stock items, which are price quoted in a widely distributed market, must be at or below the market price to gain acceptance.[3]

1. Rautenstrauch, Walter and Raymond Villers, Budgetary Control, (Funk and Wagnalls Company, New York, 1950), p. 106.

2. Heiser, Herman Co., Budgeting - Principles and Practice, (The Ronald Press Company, New York, 1959), p. 172.

3. Sord, Burnard H. and Glenn A. Welsch, Business Budgeting - A Survey of Management Planning and Control Practices, (Controllership Foundation, Inc., 1958), p. 132.

Approximately 200 different stock items are carried, based on grade, weight (basis) size and color - Sections of three floors of the Mill plus a Tredegar warehouse are used for this storage. Maximum tonnage per item ranges from 5,000# to 45,000#, with many intermediate quantities in between. The amount carried per item depends upon the following factors:

1. Space available, consistent with space for other stock items.
2. Minimum quantity, depending upon type, but largely determined by low danger point garnered from past experience.
3. Does item have any seasonal trend? A few do, such as heavy usage of crepe tape during the spring "pick-up" of fertilizer manufacturers.

Based on the above knowledge a compilation of stock movement in pounds, item by item, has been set up. This information is gathered from Sales records by period, and retained as a Mill document, being reviewed at the close of each period by Sales and Mill supervision. From this record the following useful information and decisions are made:

1. When to discontinue an item - sales do not warrant an inventory.
2. When to change inventory level, either up or down, from movement trend.
3. Turnover of each item, rather than stock as a whole.

4. Guides for determining space levels necessary for each inventory item.
5. Average size of stock shipment, which helps determine low "danger point". This is obtained by accumulating total number of shipments, when tonnage is picked up from sales invoices.

Following is a sample of this data. It is not intended to present the entire record, but merely to serve as an illustrative example.

1960 Hollywood Sales - Stock Items

During Period Ended:		Jan. 4	Feb. 1	Feb. 29
Product:				
White World -	120#	1,980 (5)*	3,120 (10)	3,240 (10)
Nat. Filter -	.025	6,302 (4)	52,009 (7)	19,123 (5)
White Matrix -	.034	15,406 (2)	9,332 (2)	15,574 (3)
	.040			
	80#		800 (1)	
White Reliance -	80#		8,000 (1)	280 (3)
	100#		5,000 (2)	
	120#	3,960 (4)		600 (4)
Moss Green Reliance -	100#	400 (1)	400 (1)	
	120#		720 (2)	
	200#		400 (1)	
Crepe Tape - Natural -	70#	17,875 (3)	49,860 (7)	71,251 (11)
	80#	25,923 (4)	22,544 (3)	37,285 (4)
	90#	36,688 (7)	48,004 (12)	19,426 (5)
Crepe Tape - Red	80#	6,002 (1)	5,007 (1)	10,644 (4)
Crepe Tape - White	80#		3,582 (1)	6,779 (1)
Vienna Noire - White	100#	50 (1)	108 (2)	300 (3)
Verigood - White	60#	60 (1)		60 (1)
	80#		260 (2)	
	100#	3,643 (14)	8,333 (28)	7,061 (25)
	120#	6,720 (19)	9,540 (16)	4,780 (18)
	140#	630 (2)	4,270 (2)	70 (1)
	200#	1,500 (3)	1,850 (3)	600 (5)
	240#		180 (1)	240 (2)

*Denotes total number of invoices.

Machine Room Standards & Production

About two years ago a set of production standards were devised for each basic product run on the paper machine. Allowances were made for such items as unavoidable down time, narrow trim, and drying difficulties, so that the performance of each crew could be compared on its own merits. These standards were largely set up on the basis of past experience and expected conditions, since prior to this time standard data was not available.[4] Even though production rates have changed over this two-year period, mostly upward, the standards have been allowed to remain in their original form and tonnage rates. This has enabled the Mill to compare today's performance with that of previous periods.

Each crew's efficiency is kept on a weekly and year-to-date basis. Other data such as down time and off-standard performance is also maintained, so as to give a running record of the relative merits of each crew. This record is posted at the work-place each week, and creates the following effects:

1. Stimulates an "esprit-de-corps" among the various groups.
2. Enables Mill Supervision to judge the performance of each group as compared with the others.
3. Points out where personnel shifts are necessary or desirable.

4. Heckert, U. Brooks and James D. Willson, Business Budgeting and Control, (Second Edition, The Ronald Press Company, New York, 1955), p. 142.

A typical week's evaluation is shown, with both performance and production detailed. Efficiencies are based only on saleable or good production, to eliminate the pitfall of sacrificing quality for tonnage. The two must go hand in hand.

Hollywood Mill Saleable Machine Production

Week Beginning - 1/22/61

Crew	Year-To-Date Eff.	Eff.	Std. Prod.	Act. Prod.	Std. Hrs.	Down Time	Off Std. Prod.	Off Std. Hours
1	113.2	115.5	78,365	90,475	37.33	4.33	7,000	6.33
2	110.4	144.5	62,235	71,290	29.0	3.0		
3	109.5	123.0	66,405	82,290	30.42	2.75	2,305	.75
4	101.1	107.0	95,510	102,205	43.16	4.84		

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
7-3	24,160	14,940	16,475	11,430	16,980	17,610	17,440
3-11	21,355	11,920	14,590	8,710	17,090	18,290	20,415
11-7	24,780	12,100	8,610	18,285	22,580	20,215	22,300
Daily	70,295	38,960	39,675	38,425	56,650	56,115	60,155
Week-To-Date		109,255	148,930	187,355	244,005	300,120	360,275

Machine Set-Up Standards

One problem inherent in Hollywood's many product changes is the lost machine time* due to set ups. This time will vary from five minutes to about one hour, depending upon the previous run, machine wash-up time necessary, and other factors. Such is true even with the best of scheduling and a good order backlog, due to the tremendous variety of products run.

Since, as previously mentioned, a paper machine consists of several machines in series, rather than one unit, several or many variables are involved. Much empirical data existed, but very little, if any of it, was tabulated. The machine tender, generally the oldest man on the crew in length of company service (Necessitated by Union seniority rules), largely relied upon experience and what he could remember of prior runs. This was particularly difficult if the product had not been run in weeks, or often months. There was the additional problem of set-ups on new production, or experimental runs.

Standardized speeds are almost a must to hold or improve on the unit cost and profit for each item. To solve the above and related problems a study was made to determine correct set-up procedure. Experience was used as a guide, and data was collected from good runs on the paper machine. This data was collected from several similar runs, even though this might take months, before being put into effect.

*Machine time worth approximately $90.00 per running hour.

The example shown is for several grades of creped papers, but over 140 such standards have been set, on over 20 data sheets. These are constantly being added to and revised, and it is expected eventually to have over 200 standards. Deviations from these on the machine tours are noted on the machine tenders log sheet. This system is quite a radical innovation in a paper mill, and has well proved its worth in down time reduction and increased production.

HOLLYWOOD PAPER MACHINE

DATE: 8/17/60

PRODUCT: Crepe Tape and Sack

GRADE:	80#	80# White	90#	90# White	110#	126#
Beaters	3	3	3	3	3	3
Consistency Reg.	2.0	2.0	2.0	2.0	2.5	2.0
Jordans: Water Wheel	Full	Full	Full	Full	Full	Full
Electric	Full	Full	Full	Full	Full	Full
Machine	Full	Full	Full	Full	Full	Full
Speed ≤	210	230	171	200	135	115
Slice	1½"	1¼"	1¼"	1½"	1¼"	1½"
Head	6½"	3½"	6½"	4"	5½"	5"
Lump Breaker	Use	Use	Use	Use	Use	Use
Dandy	-	-	-	-	-	-
Suction Boxes	Sealed	Sealed	Sealed	Sealed	Sealed	Sealed
Couch	17"	20"	14"	17"	20"	18"
1st Press	11"-2	11"-2	8"-2	8"-1	15"-2	8"-2
2nd Press	3	3	3	3	3	3
Dryers	45	45	45	45	45	45
Calender	-	-	-	-	-	-
Production 80"	2,240	2,432	2,050	2,400	1,980	1,930

Profit by Product:

It has been found somewhat difficult to follow the unit profit on a particular product by scanning the weekly profit and loss statements, due to the number of statements involved. Furthermore many of these products are run spasmodically, with no particular pattern as to time of the year or month.

As a result of this, the Mill has set up its own book, "Profit (Or Loss) By Product," for ready reference. With this we can easily watch the trend for any grade, and this can be done in a matter of minutes. The relation of machine speed to profit can be followed with a great deal of accuracy; Such is not shown on the accounting statement.

It has served as a further aid in assisting Sales in pricing new products, similar to those now in existence. Since conversion costs, material and shipping costs are known, the addition of a net profit percentage will give us Mill cost and expected profit. The addition of the selling and administrative cost (less freight) affords a suggested selling price. Such Mill data plus Sales' knowledge of the customer and the competitive market gives a quick formula for calculating a selling price.

The data sheet shown is only a partial one for one grade of blotting; Over 250 are in existence, the record on each extending back over a year and a half.

Other interesting facts revealed by this record are the frequency of making, at a glance, and the average order size for the specific product.

Profit (Or Loss) By Product

Grade - 80# Verigood

Date Run	Speed	Lot No.	Customer	Color	Tonnage	Profit (Or Loss) Per Ton
8/19/60	160	4735	Stock	White	4,780	$ 20.83
9/14/60	160	4806	J. B. Harris	White	4,095	64.62
9/13/60	156	4827	Celwa	White	1,805	22.75
9/18/60	180	4830	Stock	White	3,600	30.73
10/2/60	155	4872	Berningham	Canary	7,060	78.10
11/7/60	144	4935	J. B. Harris	White	6,030	44.50
11/15/60	156	4950	Robbins	White	1,480	61.49
12/1/60	160	4978	Dillard	Pink	5,160	83.07
12/2/60	160	4983	Stock	Blue	2,635	38.13
12/2/60	160	4987	Stock	Pink	1,070	22.83

Water and Fibre Loss

A paper mill, which must of necessity be located on a body of water, uses tremendous amounts of this resource. Fibre loss (Difference between input and output) can become a substantial cost; It can never be completely eliminated but it can be reduced.

The mill has at its disposal both city water mains and the Kanawha Canal. City water is expensive, of course, whereas canal water is free, the only cost being the necessary pumps and lines. Although a reduction in city water sounds simple, it is not. For example, city water is purer and must be used in some quality white grades. Canal water could be filtered(It is to some extent) but the filtration cost would offset other costs. A paper mill, like much of the chemical process industry, is truly a "plumber's nightmare" and water flows and lines are difficult to track down.

In any event a study was undertaken by the Mill in the attempt to reduce the city water cost. Disregarding detail the end result was to work towards what amounted to a semi-closed stock system. Most of the water used is re-circulated over and over, with only enough added to keep the system in operation. By doing this, the total amount of both city and canal water added to the stock systems was drastically reduced, city water being used only where it was a "must".

The semi-closed system greatly reduced the overflow to the river at various points, which in itself reduced the pulp fibre loss, so in actuality two accomplishments were made at once. This was done basically with a revamping of the stock lines, and while somewhat costly, afforded great savings, in the magnitude of $35,000 per year.

Although the study and physical changes that took place occupied a year timewise, the overall change could be considered a one time expense. In essence the system now takes care of itself, with only minor attention to stock line maintenance, resulting in a savings every year.

Material Cost-Furnish

The raw materials that go into the "make-up" of paper are known as the furnish, which account for over 60% of the total operational costs at Hollywood. As mentioned earlier, the furnish is largely determined by the Sales mix, which means that Mill Supervision can only exercise a limited control over it.

There is one control we do have, however; That is knowledge of pulp and dye substitution, due to the many pulps and dyes used. Between fifteen and twenty grades of pulp are carried and over thirty types of dyestuff. Most kraft mills, for instance, will carry at the most three grades of pulp and two to five dyes.

Although all of these specialty pulps and dyes have different characteristics, many are similar in some respects. As a result of this the Mill constantly tries to downgrade the furnish to a less expensive mixture, consistent with necessary quality attributes. Much of this is done on a pilot basis on Mill equipment. Extremely close liaison has to be maintained with Sales as regards customer requirements in this respect, of course. If there is a question as to saleability or quality the furnish is never down graded.

Considerable success has been achieved, however, and this process is a never ending one. One example is a substitution of one cheaper

grade of pulp (Hardwood for soda), which met customer specifications and resulted in a net savings of approximately $15,000 per year. No price reduction was necessary since the product (a specialty blotting grade) was highly competitive and priced at the market level.

This type of cost reduction is a highly specialized one and only applicable to extreme specialty paper grades, for the most part.

Burden Allocation

It is a control axiom of long standing that costs must be controlled at the source of expenditure, regardless of subsequent distribution.[5] The Mill has used this axiom in attempting to control overhead, or burden costs.

Total burden for the division is collected and then allocated against all production units on a past experience basis. This allocation is generally agreed upon by both production and financial personnel before being put into use.

A comprehensive budget affecting all aspects of operations is conducive to effective planning.[6] We have followed these concepts, and feel that all company departments are concerned with the budget and budgeted costs, be they staff or operational. Every burden account reflected in Hollywood costs has been studied, and they account for about 10% of all costs. Someone is or should be responsible for every burden account. Those responsible have been contacted and the various accounts reviewed with Mill Supervision. Where possible accounts have been changed or re-allocated to fit the case.

We do not object to bearing burden costs. They can only be borne by operations and not the staff. We do object to a sense of irresponsibility as regards their amount. By contacting those responsible we have often found that the problem was not considered a problem as such. There is often an inclination to shrug our shoulders on overhead

5. Ibid, p. 200.

6. Sord, Welsh, op. cit., p. 85.

with the remark that "they are there and we must live with them - Let's concentrate on production".

After this soul searching, reviewing and affecting what changes we could, we feel reasonably certain that ours are in line. This is done with the realization that they will probably always be the most imperfect of costs, but can be contained to a fair extent.

The main point concerning burden is the realization that we must not forget them, or be lulled into a sense of false security. Ten per cent may seem low but that is not necessarily so.

A constant review, on a once per month basis, comparisons with burden costs of past periods, with attention to new or deleted accounts, will accomplish our goal in this area within reason.

Summary

We have completed our cost analysis in this and the prevous chapters. We have alternatively called it improved cost control and a supplement to cost controls. It could be just as well called an installation of systems and procedures. Regardless of the name it has largely achieved its two basic goals of increased production and reduced operational costs.

The normal industrial engineering studies continue on -- The labor work force is reduced through methods of studies -- Such is the routine of the industrial plant and no effort is made to detract from this type of planning.

We have, as production or operating people, aided and given additional stature to such work, in our opinion. In our final chapter we will dwell more on such past, present and future accomplishments

brought forth as a result of this control system.

In our next chapter we shall deal with budgeting by product and its application to the spectrum variety as manufactured by the Hollywood Mill.

CHAPTER V

BUDGETING BY PRODUCT - APPLICATION OF THIS METHOD

The point has been stressed in previous chapters that the planned budget, as used by Hollywood, loses some of its value due to the product mix. Our prime effort in this chapter will be an attempt to rectify this weakness.

"Paper Mill Period Costs", detailed in Chapter III, presents actual and planned costs for the four week period. It will be noted that planned and actual operating costs are reasonably close for the period shown. We are not always this close, however, and luck enters into the picture when no significant variances appear.

The Sales forecast made for the fiscal year is generally within reason as regards the product mix, but is not detailed enough to enable Mill Supervision to forecast individual costs (by product) with any degree of accuracy. For example: Sales may forecast blotting sales for the year as 1,000 tons. We may actually produce approximately 1,000 tons, but included in this are about 40 different grades. Costs for each of these may fluctuate widely, due to machine capabilities and the paper make-up, or furnish costs. The furnish cost will be governed by the end use of the paper; conversion costs by tonnage per time unit (Generally taken as one hour). In other words, conversion costs are a function of tonnage per hour on the paper machine, and vary inversely. As tonnage increases costs decrease, or vice versa.

High tonnage or high furnish costs do not necessarily mean good profits, although this is generally the case. Low tonnage and high furnish costs will nearly always result in high profits, for in this instance we are

in the realm of extreme specialty grades, where there is little of a competitive market as such. Increasing the tonnage rate on any given product will, of course, enhance the profit potential. For the moment, however, we are interested in budgeted costs and not their relation to profits; This point will be discussed in more detail later in the chapter.

The use of machine standards that have been developed by the Mill, and previously discussed, will be tied in with the proposed product budget in this effort. Here we are adopting the adage of using standards to point the way to improvements and letting the budget serve as a market for keeping out of trouble.[1] The standards that have been developed are not pure cost standards per se, but they do point the way to the lowest optimum cost, and complement the budget's maximum permissible costs.[2]

Another fault of the Sales forecast as presented is that it reflects no seasonal trend. Although these are not marked they are of importance in some instances. The 1,000 tons of blotting previously referred to would merely be divided by 13 to reflect an average on a period basis. It is realized that the sales budget is somewhat closely related to the order backlog, but an effort must be made to temper this with realistic production goals.[3]

In light of the foregoing a study was made of paper manufacturing costs, extending over a one year span and broken down into thirteen periods.

1. Henrici, Stanley B., Standard Costs for Manufacturing, (Second Edition, McGraw-Hill Book Company, Inc., New York, 1953), p. 278.

2. Ibid., p. 285.

3. Rautenstrauch, Walter and Raymond Villers, Budgetary Control, (Funk and Wagnalls Company, New York, 1950), p. 73.

By covering one year a true average was obtained, which would include all exceptional periods, such as those containing high or low tonnage, or maintenance shut-downs.

Before presenting the data found as a result of this study, we will present the range of costs encountered on individual products. Actual and planned operating costs, it must be remembered, are purely average costs taken for all products.

Item	Cost Spread Per Ton
Furnish	$70 to $420
Conversion	$60 to $220
Total Paper Costs	$150 to $620

The tonnage rate per hour will vary from the extremes of 900# to 3,500#, assuming a normal trim. Although the Hollywood paper machine can trim 80", the general trim will approximate 75". In some instances a trim as low as 50" has been run, but such paper is sold at a premium rate and such orders are not solicited.

First we will consider actual and budgeted furnish costs, all based on a four week operating period. These are given on a per ton basis, unless otherwise noted.

Furnish Cost

Period	Actual	Planned	Tons Produced
1	$129	$134	497
2	142	134	592
3	143	123	549
4	144	123	459
5	139	123	562
6	133	123	524
7	116	121	541
8	142	122	555
9	126	121	500
10	132	121	590
11	119	122	613
12*	110	121	792
13	124	121	611

It will be noted from the above that actual was greater than planned nine times, and less four times. The tonnage data is presented in this table merely to illustrate that all types of periods are taken into consideration. Mill Supervision, as previously explained, exercises only limited control over this cost, since it is governed primarily by the sales mix. It does point out, however, that for the most part papers were run having a higher cost than anticipated from the Sales forecast. It is worth

*5 Week Period

mentioning again at this point that the normal furnish cost, by product, will fluctuate from $70 to $420 per ton, pointing out that this is truly only an average cost and no more. In addition it is not a straight line average but one weighted by the tonnage for each individual product, which serves to result in even more confusion when trying to arrive at a total planned cost.

Somewhat the same situation exists when plotting planned verus actual conversion costs. In this instance production management plays a much more vital role, being able in large part to influence this up or down, depending partly upon circumstances but largely upon planning skill and ability. We have broken this one cost area into its four major factors for purposes of illustrating its make-up. A planned figure exists for each but is not shown; It can be added, however, that each component actual bears approximately the same relation to its planned estimate as does the total planned to the total actual operation cost.

Conversion Costs

Actual

Period	Utilities & Clothing	Labor	Maintenance	Overhead	Total	Planned
1	$26	$26	$10	$29	$91	$85
2	19	24	6	19	68	74
3	22	24	9	20	76	81
4	24	27	23	25	100	95
5	20	25	13	20	78	79
6	23	25	10	22	80	79
7	20	23	9	21	74	76
8	18	23	9	19	69	74
9	19	22	11	20	71	73
10	18	22	9	19	68	72
11	20	21	10	21	80	65
12	23	20	6	18	68	63
13	20	22	17	21	79	66

This table reveals that actual costs were greater than planned six times, and less seven times. The differences between actual and planned are, in most cases, not as significant as those for furnish. This again points to the fact that more control can be exercised by Mill Supervision in this area than in the other major area. There are other cost areas, such as

finishing and shipping, which are important, but which in turn are minor as opposed to the cost of direct manufacturing, hence the limitation of our discussion to this major segment.

Combining both furnish and conversion costs for the same thirteen periods gives us total costs, as follows:

Period	Total Cost	Planned Cost
1	$ 220	$ 219
2	210	208
3	219	203
4	244	217
5	217	196
6	213	202
7	191	197
8	211	196
9	197	194
10	200	194
11	199	187
12	174	184
13	203	187

Here we note that total costs are greater than planned costs for eleven of the thirteen periods shown, and significantly so in most instances. The amount of variance, percentage-wise, and not the variance

itself is the point in question, ranging about to 10%.

Our last variance table will be a comparison between actual and planned tonnage, again for the same one year, thirteen period time cycle.

Period	Actual Tonnage (Net)	Planned Tonnage
1	497	513
2	592	546
3	549	546
4	459	480
5	562	546
6	524	546
7	541	546
8	555	546
9	500	546
10	590	546
11	613	538
12	792	673
13	611	538

Again variances are significant, actual being greater than planned nine times and less four times. This is somewhat of a corollary of the conversion costs, normally resulting in less than planned costs when actual exceeds planned tonnage, assuming a normal product mix. At the point of laboring the crux of our argument, all of the foregoing tables

reveal somewhat radical variances in every case, all costs shown being far from some of the extreme highs or lows.

Our plan of attack will be along the lines of budgeting each product by tonnage, which will be consequently reflected in a more logical cost break-down. This will better serve all management, particularly accounting and budgeting personnel, with a clearer conception of the problems of production supervision.[4] Our intent then, in general, is to improve upon the Mill's operating budget, which in reality is its financial plan.[5]

Originally it was intended to set up a cost and budget program for each of the basic two hundred or so products run on the paper machine. At least this was to be our proposal, which in itself was discovered to be somewhat unwieldy. Almost a thousand separate runs are made on the machine each year, many of those runs containing several product changes within themselves. As can be imagined the paper work alone could be staggering.

The final decision was made to propose a system that involved product groupings, combining similar products under one caption. The products involved per grouping would be similar as regards costs (Both furnish and conversion), tonnage per hour, and machine capabilities.

The budgeting system evolved would supplement rather than supplant the present system, comparable to what our internal cost control system has done for the overall operation cost structure. It would be applied to both the annual Mill budget and the weekly Profit and Loss

4. Nelsch, Glenn A., Profit-Planning and Control, (Prentice-Hall, Inc., 1957), p. 373.

5. Heckert, J. Brooks and James D. Willson, Business Budgeting and Control, (Second Edition, The Ronald Press Company, New York, 1955), p. 13.

statement, which in turn would be reflected in the period Profit and Loss statement. It would be particularly appropro to use it in conjunction with these statements, which are concerned with short-term operations, to assist in long range planning for growth and development.[6]

It was finally determined that there should be a break-down into ten product groupings, the groupings to be determined primarily by total product cost. Some of these groupings contain many products, other little or none. These small latter groupings are inserted primarily for the purpose of future products being in these cost brackets, rather than revising the whole system when such appear. Dollar cost per group is established as follows:

Group	Cost Spread Per Ton
I	$150-195
II	196-240
III	241-285
IV	286-325
V	326-370
VI	371-415
VII	416-460
VIII	461-505
IX	506-565
X	566-625

6. Sord, Burnard H. and Glenn A. Welsch, Business Budgeting - A Survey of Management Planning and Control Practices, (Controllership Foundation, Inc., 1958), p. 121.

It will be noted that Groups I through VIII have incremental variations of $45 per ton, whereas IX and X have variances of $60. This procedure is followed since most of the products have total costs in the lower ranges, few being in the upper ranges. In addition the scarcity of products in the high ranges, on a weighted tonnage basis, reduces their effect on overall costs. If $45 per ton seems high, remember that we are only talking about 2¼¢ per pound; Using a mid point we have further reduced this to plus or minus 1-1/8¢ per pound. Plus and minus compensations within each bracket further reduce this effect so that it becomes almost nil. Hollywood Hill products sell in the range of 7¢ per pound to approximately 30¢ per pound. We are not considering converting, shipping, or administrative costs so the range of error in a cost grouping truly becomes insignificant.

A study was made of conversion costs for all production rates, said rates being converted into dollars per ton as shown:

Tonnage Rate Per Hour	Cost Per Ton
900	$210
1000	200
1200	175
1500	150
1000	100
2000	83
2400	80
2500	75
2000	70
3000	65
3200	63
3400	60

The cost of tonnage rates falling within or outside of this spread can easily be extrapolated, which was done in many instances to obtain a true cost. The following costs were considered for each standard product:

Tonnage and consequently conversion

Furnish

Colors (Dyes), if any applicable

Dye cost was considered separately since practically every grade is made at least in the color-less (from a paper standpoint) grades of either white or natural. Many of these grades, however, are dyed to produce various colors, one particular grade alone being made in white plus twelve different stock colors.

Each basic product grade (as distinguished from our proposed product groupings) was reviewed, a cost established for each product within the grade, and the products placed within one of the ten groups. An example of this procedure was that used for the category of colored and natural crepe. This was one of the easier grades since the furnish remains essentially the same for all of the basis weights, but it does serve to illustrate the basic principles used.

Product Grade - Colored and Natural Crepe

Product	Tonnage Rate	Conversion Rate	Furnish Cost	Dye Cost	Total Cost	Product Group
50# Natural	2400	$00	$80	-	$160	I
60# Natural	2344	83	80	-	163	I
70# Natural	2240	84	80	-	164	I
70# Light Colors	2340	86	100	10	196	II
70# Dark Colors	2240	84	80	20	184	I
80# Natural	2300	83	80	-	183	I
80# Light Colors	2300	83	100	10	193	I
80# Dark Colors	2300	83	80	20	183	I
90# Natural	2300	83	80	-	163	I
90# Light Colors	2300	83	100	10	193	I
90# Dark Colors	2300	83	80	20	183	I
110# Natural	1980	85	80	-	165	I
126# Natural	1930	87	80	-	167	I

We see from the foregoing table that all of these products except one fell within Group I, the exception being in Group II. When averaged out the twelve products in Group I had an average cost of $175. Since Group I has a spread of $150 to $195, and a mid-point of $172.50, validity is shown as previously discussed with the $45 range per group.

Actually eighteen different colors are under consideration in the various light and dark colored classifications. These consist of three light shades and three dark shades for each 70#, 80#, and 90# basis weights. Since dye cost (not paper color) is approximately the same for all of these light shades and all of the dark shades, they can be grouped as shown with no appreciable error.

This same basis procedure was followed for all of our standard product grades, involving some eighteen in all. Although some rarely run items are not included, that studied accounts for about 90% of all of the tonnage run. Each product grade contains a number of items, varying from two to twenty four, with the average being about twelve. The following tables incorporate the final results of this study into all 10 groups.

Product Group I

Cost Range $150-195
Average Cost $172.50

Products:

50# Natural Sack
50# Natural Crepe
60# Natural Crepe
70# Natural Crepe
70# Crepe - Dark (3)
80# Natural Crepe
80# Crepe - Light (3)
80# Crepe - Dark (3)
90# Natural Crepe
90# Crepe - Light (3)
90# Crepe - Dark (3)
110# Natural Crepe
126# Natural Crepe
.025 Kraft Filter
110# Crepe Filter
125# Crepe Filter
60# Asphalt
99# Asphalt
60# Kraft Blotting
87# Kraft Blotting
.050 Kraft Blotting
.015 Battery Board
.025 Battery Board
.040 Battery Board
55# Tile Backing
60# Wrapping
120# Wrapping
Cork Gasket .007-.036 (7)
Plain Gasket .0035-.036 (12)
Plain Gasket, Colors .0035-.005 (2)
40# Building Kraft

Items - 59

Product Group II

Cost Range $196-240
Average Cost $210

Products:

70# Crepe - Light (3)
50# White Sack
60# White Sack
70# White Sack
60# White Shopping Bag
70# White Shopping Bag
125# Shunt Kraft
.034 Matrix
.040 Matrix
Blotting Rolls - 52#-120# (5)
White Reliance - 60#-200# (4)
White V. G. - 60#-160# (6)
White ½ Tone - 60#-100# (3)
Colored V. G., Light (6)
Embossing Blotting (2)
Cork Gasket - .050
Plain Gasket, Colors - (6)

Items - 44

Product Group III

Cost Range $241-205
Average Cost $263

40# Sack - Colors
50# Sack - Colors
60# Sack - Colors
70# Sack - Colors
60# Shopping Bag - Colors
70# Shopping Bag - Colors
Blotting Rolls - Colors (6)
Reliance - Colors (3)
White World (3)
44# Cover - White
57# Cover - White
44# Cover - Colors
.062 Colored Gasket
.052 Colored Gasket

Items - 23

Product Group IV

Cost Range $206-325
Average Cost $300

World Colors (3)
57# Cover - Colors
Jute Cork - .015-.020 (4)

Items - 8

Product Group V

Cost Range $326-370
Average Cost $348

Jute Cork - Colored (4)

Items - 4

Product Group VI

Cost Range $371-415
Average Cost $393

.054 Jute Cork, Plain
.054 Jute Cork, Colored

Items - 2

Product Group VII

Cost Range $416-460
Average Cost $438

60# Full Flow
85# Full Flow
.062 Jute Cork, Colored
60# Oil Filter
200# Oil Filter
150# Oil Filter

Items - 6

Product Group VIII

Cost Range $461-505
Average Cost $483

75# Wool Floc Filter

Items - 1

Product Group IX

Cost Range $506-565
Average Cost $536

60# Wool Floc Filter

Items - 1

Product Group X

Cost Range $566-625
Average Cost $596

75# Air Filter

Items - 1

A recap of the foregoing Product Groups would reveal the following:

Product Group	Number of Items	% of Items
I	59	39.6
II	44	29.5
III	23	15.4
IV	8	5.4
V	4	2.7
VI	2	1.3
VII	6	4.0
VIII	1	.7
IX	1	.7
X	1	.7
	149	100.0

As could be expected from previous discussion the majority of products fall within the lower groupings. The trend within the last year or so, however, has been a shift towards the higher cost (and price) groups. Five years ago 80% of the products would have been in Group I, with most of the excess in Group II, and possibly a very few in the cost range of Group III. It is expected that the upward cost shift will continue as the Mill makes more specialties at the expense of standard kraft grades. Group I will always retain some tonnage but the median cost will probably shift towards Group V. There have already been a number of experimental runs within recent months which would fall in Groups VI-X cost-wise. Many of these will no doubt become production runs as approved by customers.

Although only 149 items are listed, in reality nearer 200 are covered, since many products can be duplicated at the same cost. For example, twelve different colored shades of 50# sack are manufactured, all at approximately the same cost level. A further possibility exists that more groupings, if the system is adopted, will be needed in the future, to contain additional higher cost low tonnage, high furnish cost items.

Another relation exists between the percentage of items in each group and the percentage of total Mill tonnage concerned. Furthermore, the higher cost items tend to take more machine time, since in general part of their high cost is due to low machine capabilities (Tonnage-wise) on these grades. This relation in comparison to Group percentages is approximately as shown:

Group	% Items in Group	% Tonnage in Group
I	39.6	29.0
II	29.5	35.0
III	15.4	20.0
IV	5.4	3.0
V-VII	8.0	10.0
VIII-X	2.1	3.0
	100.0	100.0

Actually all items from the various groupings constitute about 90% of total tonnage, but the above table is relatively correct. The base reasons for not including the 10% are:

1. Grades rarely made (Once per year or less).
2. Grades now made at Hollywood but to be transferred to other company mills in the near future.
3. Grades now made upon occasion, but which will be ceased as company items within the near future.

Budgeting each individual product by its approximate cost, rather than by the average cost for all products, now will afford us a better way to plan and correlate costs with actual results. The preparation of

the annual budget now becomes more a cooperative action embracing all management levels.[7] Administration of the budget remains the responsibility of the Budgeting Department, as it should, but Mill Supervision can take a more active part in cost prediction.

Our proposals can be put to use in two major areas, namely the weekly Profit and Loss Statement and the period Cost Statement, both displayed in Chapter III. We will first outline our plan for the Profit and Loss Statement, since its application is much the simpler of the two.

A separate column would be inserted into this statement, classifying each product as to its proper group, from I to X. This information would be kept on both a weekly and year-to-date basis and analyzed periodically by Sales, Finance and Production. From this analysis we could better determine the future direction of our sales and production efforts for better control of profits and costs. This would be done, of course, with the full understanding that all products cannot be made at a high profit and corresponding low cost, but at least we could keep this basic goal in mind. It is almost impossible to do this completely from the present statement due to the myriad and complexity of items produced for customer sales.

Application to the Period Cost Statement becomes somewhat more difficult, but it could be accomplished in one of two ways:

7. Heiser, Herman C., Budgeting - Principles and Practice, (The Ronald Press Company, New York, 1959), p. 57.

1. Leave the present budget as is, and use the grouping system as a supplement.
2. Incorporate the grouping system into the body of the present statement.

Method 1 finds more favor and is probably more realistic, at least for the near future. In either case, however, the Sales Forecast would have to be based on the proposed groupings, which can be done fairly readily with a combination of past records and a knowledge of future economic conditions, both in the economy as a whole and the paper industry, with particular emphasis on specialty products, specifically. This is done at the moment anyway, the only difference being in the method of approach.

Although the Sales Forecast would continue to be handled on an annual basis, period revisions could be made as their need arose. This could even be done after the fact for a while, or until the system became more firmly established.

Products, by grouping, would be forecast for the period, and accumulated at the end of each period, and on a year-to-date basis. Since their cost is already established this could be readily stated, with only periodic reviews for changes in their cost structure. Thus by using the system as a supplement we would have actual and budgeted costs by each individual product (Through groupings) as well as the average cost which we now have.

This system also falls in line with our cost control system. Both are designed to improve upon, rather than supplant the present methods. Our cost control changes are at present either in use or being put into use, while the budgeting method is in proposal form, which has met with some favor, incidentally.

In our next and final chapter we shall review the entire plan, both cost control and budgeting methods. Not only Hollywood Mill but other specialty applications will be considered, as well as results of the system and its future.

Chapter VI

INSTALLATION OF THE REVISED PLAN; SUMMARY AND CONCLUSIONS

It is hoped at this stage that the reader has a more than cursory knowledge of the functions and operation of a specialty paper mill. Such a knowledge is indispensable in understanding the cost and budget program at Hollywood Mill, hence the time and space devoted to the Company and Mill scope of operations in the first two chapters.

It will be recalled that our first chapter dealt primarily with the history of Albemarle, from its inception in 1887 to the present day physical structure. This was done on somewhat of a broad basis, at the same time attempting to portray each division in enough detail so that future references would not leave the viewer with hazy misconceptions. Hollywood Mill, comprising one plant of one operating division, was mentioned only briefly at the beginning of the chapter. We did see Hollywood, originally the cornerstone of the parent organization, have a rise and then fall almost into obscurity within recent years.

Our second chapter reviewed the history of Hollywood, with emphasis on its resurgence of the past decade, particular emphasis being placed on the achievements of the last five years. In this chapter we discussed many specifics, such as the current organization and capital growth by item. A beginning was made on our costing procedures, past, present and future. It was pointed out that the Mill, subject to sale a few years ago, has now become one of the dominant factors in the Richmond Production Division of Albemarle. The Mill's products,

formerly limited almost exclusively to kraft and blotting in a small sales area, have now reached the point where they cover a multitude of uses and are sold in a large part of this country and abroad.

It was recognized that the Mill is largely a combination of the old and the new, due to the age factor of much of the producing units. Capital has begun being put into the Mill recently, however, and it is felt that this trend will continue as the plant continues to prosper. Tonnage and profits have increased in the face of rising labor, capital and material costs. Even though the labor rate has increased drastically in recent years, an offset has been maintained by reducing the total payroll (in number of employees) through methods improvements.

Although Chapters I and II were necessary for the reader's background and understanding, Chapter III began the real gist of the argument. It was mentioned in this chapter that the material from that point on was completely original with the author and his staff. This statement was a realistic one, but it must be remembered that some of the results shown in Chapter II are due in part to cost improvements detailed in the later stages of the thesis. Both the present cost system and budget analysis were presented in this section, on an "as is" basis. A review was also made of two basic Profit and Loss Statements, on a weekly and period basis. It was revealed that even though our budget system has limiting factors, it does serve as a tool for both coordination and control.[1]

1. Heckert, J. Brooks and James D. Willson, Business Budgeting and Control, (Second Edition, The Ronald Press Company, New York, 1955), p. 131.

The basic fault of the budget as it pertains to Hollywood Mill, i. e. the use of average costs, was discussed at great detail at this point. Such average costs are useful for the large kraft or single product Mill, but lose some of their effectiveness when applied to many products with many cost gradations. The aims of the thesis, as implied by the title, were two-fold-- To improve methods of cost control and budgeting, as applied to the specialty paper mill.

The decision was made to make any necessary or possible cost improvements before attacking a budget revision or simplification. This was done so as to have our costs at the optimum low point, or at least reasonably so, before applying them to the budget, and thus avoid building on a loose foundation.

The remark was made that the cost control system as presented could also be entitled "A Study in Systems and Procedures". This was rightly so, with direction placed on such phases as scheduling and standard procedures, rather than on such time proven methods as Industrial Engineering labor studies. These methods already existed and were in continual use, whereas our goal was a stream-lining and revision of the methods by which the Mill operates, both on a short and long-range basis. The approach used was actual rather than academic, since we had a working model to select our data from. Furthermore this had to be done with the end in mind of proven results rather than experimental data, since we were dealing with a "going" production unit.

The larger part of Chapters III and IV were used for presenting these control procedures. Wherever possible and in almost every case an example of the method used, or to be used, was presented. Some of these methods are about two years old, although most are innovations of the past year, with some being of even more recent vintage. These methods and procedures are not foolproof, and no claim is made as such, but they do constitute a great step in the direction of cost reduction and the consequent profit increase. If any single one had to be singled out as having more merit than any other we would have to pick the various production scheduling devices.

It was pointed out that most of these systems improvements or installations had little or no pure costs involved, other than the consideration of time involved. The procedures involved are primarily used for internal rather than external cost control, particularly since they were developed and put in use by Mill personnel. The Sales Department and top Production Management, however, have found some of the systems to be of great use in their phases of control.

Cost controls as established in Chapters III and IV were, as stated before, almost completely in operation before an attempt was made on the budget revision. Chapter V was devoted in its entirety to this end, and was in some respects the most difficult part of this work. Although changes are suggested and proposed, the definition of a budget as an over all "blue-print" of a comprehensive plan of operations and actions, expressed in financial terms, was strictly adhered to.[2]

2. Heiser, Herman C., Budgeting - Principles and Practice (The Ronald Press Company, New York, 1959), p. 3.

As previously stressed, the current budget in use is largely based on average costs, which are true in themselves, but shed little light on the multitude of products that are far from being average in cost. It was revealed that while average production costs (Paper Machine) are approximately $200 per ton for all tonnage, the actual cost by product will vary from $150 to $620, depending on the end use of the item.

Costs for all major products were accumulated and put in tabular form, a total of ten groupings being used. Table increments were set at $45 per ton, for reasons stated, for most of the tables and $60 for the extreme upper ranges. These tabular groupings contained 90% of all present products made, 10% being excluded for various reasons. By budgeting in such a manner we can better serve the three purposes of planning, coordination and control.[3]

The question arose as to the best method of applying these groupings for the purpose of better planning and control, two solutions being suggested:

1. Incorporate in present budget, or
2. Use as a supplement.

The second method was found to have more direct application, plus ease of usage. Basically the Sales Department would have to make

3. Ibid., p. 107.

their annual forecast from these groupings, rather than by broad product grades as at present, but this would be the only radical change. Information is currently maintained by the company Tabulating Department which would make this transition relatively simple. We feel that use of the groupings would prove fairly easy to compute once established, and would better enable the actual budget to serve both as a "go-ahead" signal and a standard of performance.[4]

The budget changes as proposed would originally serve only for the purpose of controlling the costs of the manufacture of paper, and not the final finishing (If any) and shipping operations. These costs could later be budgeted in somewhat the same manner, but would be strictly a secondary step. Manufacturing costs comprise the greater part of the Mill effort, and when in phase and properly controlled serve to have a great influence on secondary cost considerations. In addition this budgeting method must in a sense be proved before it can be applied to other operations, and weak points corrected, which can only be done by actual usage.

As mentioned the cost and control program described is in operation and under constant modification, whereas the budget procedure is in proposal form. This proposal, or a modification of it, has been discussed with our Budget Department, and the procedure has met with some favor. It is felt that the near future will see its adoption or an adaptation of some form of this method.

4. Ibid., p. 84.

The procedures as outlined in the thesis body are specifically directed towards the specialty mill with its unique problems, caused primarily by the "rainbow" product mix. Many other reasons exist, but we have seen the procedures outlined play a major part in accomplishing our desired goals of cost reduction, and its by-product of increased net income.

Every specialty mill is somewhat unique unto itself, depending on its variety of products and other associated factors. Some such mills constitute a corporation, others are like Hollywood, one unit within an organization. It is difficult and inconceivable to say that the entire program could be transplanted from Hollywood to another specialty paper mill, and the same end results obtained. It is not inconceivable, however, to say that many of the procedures could be put to successful use in other such mills. The experience of each such mill and its inherent problems would be the best determinant of this.

Some of the methods outlined could probably also find partial use in the large single or several product mills, but here the use would definitely be limited to only minor operational phases. This is in the nature of an after thought, for our thinking is still primarily directed towards the improvement of the operational methods of the specialty paper mill.

The large kraft and newsprint mills dominate the paper industry, by the sheer enormity of their size and production. The paper industry is a major growth segment of our nation's industry in all its aspects.

however, and the specialty mills and their products continue to grow proportionately with the industry. Filters, gaskets and saturated products, once the sole property of leather, rubber and more sophisticated materials, are now predominantly made of high grade paper products. To further increase their use we must find more and better ways to reduce and control these costs -- It is hoped that we have contributed some knowledge and "know-how" towards the attainment of this goal.

Bibliography

Albemarle Paper Manufacturing Company, Inc., Annual Report: Richmond, Virginia, March 31, 1960

Heckert, J. Brooks and James D. Willson, Business Budgeting and Control, (Second Edition, The Ronald Press Company, New York, 1955)

Heiser, Herman C., Budgeting - Principles and Practice (The Ronald Press Company, New York, 1959)

Henrici, Stanley B., Standard Costs for Manufacturing (Second Edition, McGraw-Hill Book Company, Inc., New York, 1953)

Rautenstrauch, Walter and Raymond Villers, Budgetary Control (Funk and Wagnalls Company, New York, 1950)

Sord, Burnard H. and Glenn A. Welsch, Business Budgeting - A Survey of Management Planning and Control Practices (Controllership Foundation, Inc., 1958)

Welsch, Glenn A., Budgeting: Profit-Planning and Control (Prentice-Hall, Inc., 1957)

Paper Mill Terminology

This list is by no means complete, and is merely intended to clarify key terms and give the reader the "feel" of paper manufacturing.

Alum - An aluminum sulfate used for precipitating rosin size onto the pulp to give water resistant properties to paper.

Asphalt Paper - A general term which includes papers saturated or coated with asphalt or other bituminous material.

Basis Weight - The weight in pounds of a ream (480 or 500 sheets) of paper cut to a given size. The standard size ream varies with different grades of paper according to trade practices.

Beater - A large mixer in which the pulp is mixed with the other ingredients of paper.

Blotting Paper - An unsized paper used generally to absorb excess ink from freshly written manuscripts, letters, and signatures. It is also used for many other purposes where absorbtivity is the required characteristic or where soft, spongy paper is needed, even though absorbtivity is of secondary importance.

Broke - Paper trimmings or damaged paper from the Machine Finishing Rooms. Usually returned to beaters for re-processing into saleable paper.

Calendar Stack - Steel rolls at dry end of paper machine which smooth and level the sheet of paper.

Caliper - The thickness of a sheet measured under specified conditions. It is usually expressed in thousands of an inch (points or mils).

Fibre - The fibrous material remaining after the non-fibrous components of wood have been removed by pulping and bleaching operations; used in making paper.

Couch Roll - Roll used to separate wet paper web from the "wire".

Crepe Paper - A general term descriptive of an effect simulating crepe produced by crowding the wet sheet on the roll by means of a doctor.

Cutter - A machine which cuts roll of paper in to predetermined sheet sizes. The sheets are then cut to final size on a guillotine trimmer.

Dry End - That part of the paper machine where the paper is dried.

Dryers - The steam-heated cylinders over which paper in the web is passed to be dried.

Embossed - A finish imparted on paper by means of raised or depressed engravings on steel rolls so as to leave a visible surface design on the paper.

Felt - A woven cloth used to carry the web of paper between press and dryer rolls on the paper machine. Woolen felts are used for the wet web in the press section. Dryer felts of cotton or synthetic materials carry the paper web through the dryer section of the machine.

Finish - To "finish" paper is a term used to describe the cutting, counting, sorting, trimming and packing of paper.

Fourdrinier - The name given to the wet end of the type of paper machine invented by Louis Robert, financed by the Fourdrinier brothers. It is usually applied to an entire modern paper machine, including the dry end, which was not, however, a part of the first paper machines.

Furnish - The list of ingredients that make up a particular paper. To "furnish a beater" is to place in it the materials specified by the formula for the paper.

Job Lot - Paper produced in excess of an order.

Jordan - A machine used to refine paper stock. It controls the length of paper fibres. Paper stock goes through the jordan after it has come from the beater and before it goes to the paper machine.

Kraft Paper - A paper of high strength made from sulfate pulp.

Kraft Pulp - A strong pulp made largely from pine by the sulfate process.

Laminated Paper - A paper built up to a desired thickness or a given surface by joining together two or more webs or sheets.

Machine Wire - The continuous, copper meshed wire which is the traveling surface upon which the web of paper is formed. It is usually referred to as the "wire".

Making Order - Any order which cannot be filled from stock and is to be made according to purchaser's specifications.

Paper - A homogenous formation of primarily cellulose fibres which are formed in water suspension on the machine wire and bound together by weaving of the fibres and by bonding agents.

Paper Machine - The machine upon which the fibres and other components of paper are formed, pressed, dried, calendared, wound upon reels, slit into appropriate widths and wound into rolls, or cut into sheets in certain cases.

Pulp - Papermaking material existing in a disintegrated fibrous wet or dry state. Before it is dispersed onto the paper machine, it is mixed, beaten and

diluted to a consistency suitable for fabrication into paper.

Ream - A quantity of paper - 500 sheets for most papers, some tissues 480 sheets.

Rewinder - A machine which takes rolls from the winder, and slits or rewinds them into smaller rolls.

Slitter - A sharp disc which cuts paper into predetermined widths.

Soda Pulp - Pulp made from deciduous or broadleaf trees, such as poplar, by the soda process.

Sulfate - Alkaline process of cooking pulp. More often referred to as kraft process. Also, pulp cooked by this process.

Suction Press - Press used to remove water from paper after the wire, by a combination of vacuum and pressing action.

Stock (1) - Same as Furnish.

Stock (2) - Paper produced for inventory in large lots, and sold in smaller lots on a customer basis.

Trimmer (Guillotine) - Machine which cuts sheets to final size by the diagonal motion of the cutting blade or knife.

Tuber - The machine which takes two or more paper rolls, lays them together to form a multiwall ply, and forms into a multiwall bag. The bag ends are then sewn to complete the process.

Waterproof Paper - A term for a water-repellent paper prepared by combining two sheets of paper by means of asphalt.

Wet End - The beginning of the paper machine, comprising the headbox, wire and press sections.

Wire - The moving "screen" at the wet end of a paper machine where the sheet is formed.