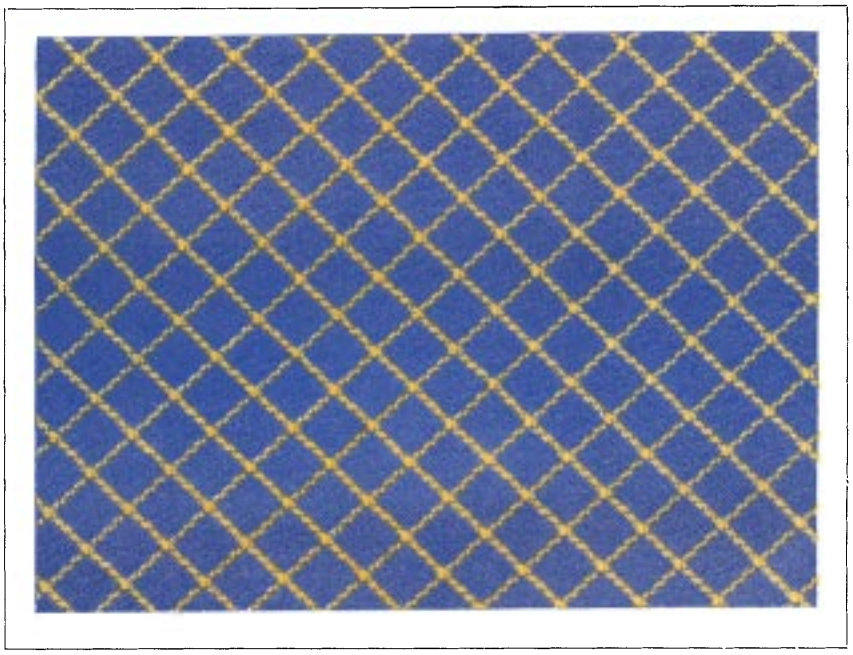
Assuring Weaving Mill Profits in a Tight Market

Improved Looms Alone Give a Fancy Mill 8% Margin

By ALBERT PALMER

In a highly competitive market the selling price of a product, particularly one of which the supply tends to exceed the demand, is not much greater than the cost. The situation may be even worse. The selling price may be made lower than the cost either through ignorance on the part of individual manufacturers or by their desire to obtain business regardless of cost in order to keep their organizations together.



One of the Fabrics upon which the Tests were made.

The textile industry is suffering from this evil. Mills are forced to take business upon a margin of profit that is negligible or that does not exist; consequently, one by one the weakest are closing their gates or are liquidating.

To outlive this era of low prices is the problem of every mill, a problem to which the answer is low costs. The mill that can keep its costs below the current selling prices is the mill that will survive. For this reason an increasing interest is being taken by the textile mill men in anything that contributes to greater economy.

In general, economies in manufacture originate from two sources; first, improved operating conditions resulting from a thorough study of all the processes of the plant, and second, better machinery or equipment designed and constructed by builders who have based their plans upon facts acquired through research. Both of these agencies unite to accomplish one end; namely, production at a low unit cost.

Fundamentals of Cost Reduction

The cost per unit of product in any mill is equal to the cost per unit of time of operating the machine upon which the product is made, divided by the number of units of product made by the machine during the same period. To reduce the cost per unit of product, then, the cost per machine per unit of time must be decreased and the production per machine per unit of time must be increased.

These results can be accomplished through lessening the demands of the individual machine upon the operative. The operative, being human, is capable of exerting a limited amount of energy during the day. This can be measured easily and can be expressed in terms of the operations that he can perform. It follows, then, that the number of machines that he can tend is fixed by the number of operations that each machine requires of him during a given period of time. In other words, if the number of operations per hour that the worker can perform is known and if the number of operations per hour required of him by each machine is ascertained, the number of machines which he can tend can be found by dividing the former by the latter. This number can be increased only if the demands of the individual machine are minimized.

The work of decreasing the number of operations demanded of the operative by each machine has been undertaken in progressive mills with the coöperation of consulting engineers and machine builders. The investigation usually starts in the Weave Room where the causes for the stoppage of the looms are ascertained. Corrective measures then are taken. These include not only changes in the processes back of the Weave Room but also changes in the weaving machinery itself.

New Machinery Results In Economy

While much can be accomplished by bettering the conditions of operation in a mill by process studies alone, the gain is but partial. Process studies will reduce costs by enabling the weaver to tend more looms and by increasing through greater continuity of operation the production per loom. But they do not make available the advantages of scientifically designed machinery — machinery capable of high speed, demanding little attention of the operative, and adapted by reason of its flexibility to the ever-changing requirements of a highly particular market.

That some improved modern machinery will in itself overcome many of the faults in the material has been demonstrated by certain New England mills which have installations of the new automatic Crompton & Knowles Cotton King loom. Running on the same fabrics as the old automatic loom which it has replaced, it has decreased materially the work demanded of the weaver. In one case a set of these new dobby looms running beside an equal set of the old type of automatic dobby dress goods looms had an average rate of stoppage which was 63% of the average rate of stoppage of the old looms. The warp breakage was 79%, the filling breakage at transfer was 32%, and the filling breakage other than at transfer was 46% of the same class of trouble in the obsolete design.

With these characteristics, attributable to design based upon the results of research and to precision in construction obtained through new methods of manufacture, the loom cannot avoid being a substantial contributor to lower costs. Those who have observed it for months know that it can produce cloth at a cost per yard 25 to 30% lower than the cost per yard for the same fabric woven on the old looms. In terms of the final cost of the goods, this saving represents at least 6% of the total cost, including the cost of the material. With such a reduction the possibilities of making a

profit under low selling prices are enormous, especially when consideration is given to the fact that the figures cited here apply to the Weave Room alone.

A Typical Example

To illustrate the manner in which this question can be studied, the case of one mill is taken. An installation of the new dobby looms and an installation of the old automatic dobby dress goods looms were placed upon fabrics of the type shown in the illustration. The construction of the cloth was as follows.

Fabric:	Dress goods
Weave:	12 harness dobby 3 boxes
Stock:	Warp—1 1/32″ middling cotton Grade "A" rayon Filling—1 1/32″ middling cotton Grade "B" rayon
Warp:	28.5/1 cotton Twist—24 turns per inch 200 denier rayon
Filling:	28.5/1 cotton Twist—24 turns per inch 200 denier rayon
Sley:	64
Picks per inch:	56
Width finished:	36 inches

The performance over a period of four months yielded the following results: Both old and new looms were full automatic. Comparison therefore, is not between an automatic and a non-automatic loom.

Item	Old Loom	New Loom	Ratio New to Old Loom
Production in gray yards per loom per week	153.5	184.4	1.20
Seconds, per cent. of finished yards	1.05	.88	.84
Cotton waste, per cent. of weight of cotton filling actually used	2.62	1.33	.51
Rayon waste, per cent. of weight of rayon filling actually used	2.46	1.39	.57
Weaver's operations per loom per hour of running	3.293	2.074	.63

The studies from which these figures were obtained indicate that a reorganization of the Weave Room is necessary, if the most economical conditions of operation are to be obtained. The weavers now tend 12 looms. Those who operate 12 old looms are over-worked. Those who have 12 Cotton King looms have not enough to do. By

providing a battery hand and by assigning to the weaver enough looms to keep him busy without exerting himself unduly, the following program has been laid out:

Item	Old Loom	New Loom
Looms per weaver	10	24
Hours per week	48	48
Speed, picks per minute	150	153
Picks per inch	56	56
Per cent. production	77.9	86.3
Yards per loom per week	167	189
Cost per loom per week	$6.90	$5.27
Cost per yard	$4.13	$2.79
Saving per yard	—	$1.34
Saving, per cent. of old weaving cost	—	32.4
Saving, per cent. of total cost including cotton	—	8.1
Annual saving per loom		$126.63
Return on investment in new machinery		21%

The situation here is obvious. With a cost that is 8% lower than its old cost, the mill has a wide margin in which to operate. Business taken at current prices will yield a profit of 21% on the investment. Business taken at lower prices to keep the organization together will be figured in black instead of red. That is why the advance of scientific study leaves the wreckage of old machinery and old methods along the path of progress.