

because of an attempt to live up to an established personnel figure. When the committee authorization has been passed on to the vice-president in charge of production, it is within his province to break down the total demand upon the combined works to production quotas for the individual works. When the works receives its quarterly quota, it is within the province of the particular works to suggest to the vice-president in what portion of the quarter the bulk of the production can best be scheduled. When the monthly program has been authorized by the vice-president, each works manager breaks down the month's quota to quotas for each department. As each month of the quarter approaches, the works manager provides each department with its coming month's quota and, after the close of each month, comparison is made of actual production against quota production by the various departments.

Thereupon, there is published in the works house organ a comparative tabulation of actual production against quota production, just as actual sales are compared against quota sales in the sales department house organ. In the case of the works' comparison, however, there is not only comparison of actual production against estimated production, but also a comparison of actual number of personnel compared with authorized number of personnel, with a third comparison showing the net efficiency in view of both actual production and actual personnel. For instance, a 20 per cent increase over production quota, secured by 96 per cent of the authorized personnel, would represent an efficiency against quota of 125 per cent. Thus, it is seen that the statistical control, establishment of quotas, and check-up of actual performance against quota, is carried up to the controlling committee from the individual sales unit and brought down to the individual department in the individual producing unit.

It would be disappointing to the reader to have read thus far without an opportunity to satisfy himself as he asks the question—"How does it all work out in practice?" It is realized, of course, that performance comparisons of actual against estimates are very unsatisfactory as really evidencing the adequacy of any business procedure. One may always select incidental favorable comparisons, neglecting to report the many unfavorable ones. On the other hand, many comparisons which look unfavorable are really very favorable when all the circumstances are known. To compare the actual percentage of the

total year's sales attained in the first quarter of 1923—namely, 26 per cent—with the assigned proportion of the year's business—namely, 23 per cent—will suggest a fairly wide margin of error. This is true also in comparisons made of the percentages representing first half year's business anticipated to be received—namely, 48 per cent—against the actual attained or 57 per cent. And again, to say that 110 per cent of the full year's quota was actually attained will suggest at least a 10 per cent error in estimating.

Quite on the contrary, however, further analysis of the performance reveals that one very tangible reason why sales were recorded abnormally early in the year, and in amounts exceeding anticipations, is because the estimate had been made. It would have been difficult to have made such a poor showing against the estimate had we not taken steps, because of the estimate, to change the condition which might otherwise not have been anticipated. Having committed ourselves to produce material for stock up to the dead line limit, however, placed us in a position to ship out stock much earlier in the year than had ever happened before. Moreover, the planning enabled us to produce an additional amount which could not have been produced had we not taken just such steps to increase production well in advance of the sudden increase in demand. Incidentally, this increase of orders came at the time of greatest seasonal efficiency in production, at a time when costs were low with reference to selling prices. There was, then, the net effect that the bulk of the year's production was sold and shipped during the brief period of peak prices, instead of being held over for shipment after anticipated price decreases had become effective. Such are some of the advantages of control in anticipation of a rising market and of the consequent reward reaped during boom times.

It is obviously a poor control, however, that will not work both ways. In the spring of 1923, when all the then recent records indicated continuously increasing business, we were faced with the necessity of changing our course because of the certainty of a change in the course of the business cycle. In all forecasting there is always the necessity of determining future probabilities from three view points: first, as to the probable *direction* of the future trend; second, as to the *time* of change in trend; and, third, as to the *extent* of the movement in its general direction.

Properly to appreciate their significance, performances need sometimes to be evaluated in the light of

SOME LAST-HALF 1923 ESTIMATE PERFORMANCE COMPARISONS

(Estimates which entered into late 1923 control)

(All estimates recorded in reports in month stated)

Month	For	It was necessary to estimate the variable		Then to select a Constant Relevant Operating Ratio	In order to plan for Desired Levels of these Assets on 12/31/23				
		Factor	Estimated		Actual	Planned	Actual		
A	June	Works' Production—Inventory Control	Combined Works' 4th Quar. 1923 Orders:		Average "desirable, yet possible" turnover rate for each product group	Combined Works' In Process inventories at 12/31/23:			
			(a)—In % under 1st Quar. known levels.....	35%		59%	(a)—In % under July, 1923 levels.....	20%	16%
			(b)—In actual tons of orders.....	7000	6560	(b)—In tons of inventory.....	3460	3640	
Dec.	Revision of above	Combined Works' Jan.—Feb. 1924 Orders:	(a)—In % over known 3rd Quar. 1923.....	102%	93%	(Excess permitted because of anticipated Jan.—Feb. 1924 peak of orders—see Est. at left)			
			(b)—In actual tons of orders.....	9920	9530				
B	Aug.	Payment of Notes by Liquidating Receivables	Nov.—Dec. 1923, Daily Rate of Sales (Billings):		Number days sales tied up in total receivables:.....	Liquidation of Receivables (a)—No. \$ less than June, 1923, levels (that is, the amount to be released to pay notes).....	\$640,000	\$400,000*	
			(a)—No. \$ drop from known spring peak levels of Mar.—Apr. Daily Rate.....	\$32,500		\$30,000	(b)—12/31/23 Balance.....	\$2,000,000	\$2,240,000
			(b)—Resulting Nov.—Dec. Daily Rate.....	50,000		52,500	*(Failure due to greater number days—less discounting—and slightly greater sales, all errors concentrating in this margin of reduction)		
			(c)—Dec. Total Sales....	1,200,000		1,225,000			
C	July	Branch Inventory Control	Total Branch 4th Quar. 1923 Purchase Cost of Stock Sales (Inventory carried at Purchase Cost):		Average number months' sales represented by branch inventories is 3 months. But on declining market it would be policy to have a lesser number of months, as shown.....	For Total Branch Inventories (based on sales and turnover rates) established—marks to be reached by 12/31/23, were set:			
			(a)—In % under 4th Quar. 1922 levels.....	25%		24%	(a)—In % under July, 1923 levels.....	39½%	39%
			(2nd Quar. 1923 had been 90% over same quarter in 1922.)			(Some a full 50% cut ordered)			
			(b)—In Actual Dollars..	\$1,077,000	\$1,067,000	(b)—In Dollar Value (at cost).....	\$940,000	\$950,000	

Figure 11