

Material Handling Classics™

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ANALYZING YOUR PRESENT OPERATION 1977 NATIONAL MATERIAL HANDLING FORUM

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Good morning/afternoon, Ladies and Gentlemen:

I want to spend some time with you today, sharing my thoughts on the topic, "Analyzing Your Present Operation". This subject, like most others in this Forum, deserves much more time than could possibly have been allowed it. Hours could be spent, for example, on such questions as, "Who should analyze operations?" "When should such analyses be made?" and "What should be included in the analyses?" Other than a few passing remarks about those general questions, I plan to limit this discourse to "WHY" and "HOW" such analyses should be made.

The answer to the question of "WHO" is, quite simply, that person responsible for performance! It follows, then, that all levels of management must analyze the operations for which they are responsible. Obviously, this means that there must be analyses on top of analyses, but that is alright because the techniques and the intensity with which the task is approached varies with the level of management involved.

Answering the question of "WHEN" analyses should be made is also easy, in that most operations must be and are continually evaluated. The line supervisor is continually observing his people as to their motivation and/or attitude. Similarly, intermediate and top levels of management continually review and devalue their subordinate levels of supervision. These qualitative evaluations are easy and in most cases informal. Quantitative evaluations are something else, because they are more formal and require more effort in their completion. This effort is in the form of establishing and keeping records, collecting data, making calculations, reviewing reporting systems, etc. In fact, on many occasions I am told that the cost for quantitative evaluations of labor make such evaluations prohibitive. In most cases I completely



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Material Handling Classics
Page 1 of 7

disagree. It is little wonder then that the answer to the question of “WHEN”, is “as often and as completely as can be cost justified”.

We really get to the heart of the matter by spending some time on the question “WHY”. Why must we evaluate existing operations as often and as completely as can be justified? There really need to be only one reason, and that is that a growing enterprise depends on optimum utilization of money, manpower, machinery, and space. Therefore, it is incumbent on all of us, as capitalists, to continually strive to improve such utilization. Just staying even is not good enough!

Optimizing the utilization of money, manpower, machinery, and space is really a four state process:

- Evaluate existing utilization to ascertain what is happening.
- Set reasonable standards for utilization based on current volumes and/or policies.
- Set goals for improving operations so as to meet standards for existing operations as well as needs for the future.
- Follow-up.

It should be obvious that the stages are progressive and that each must be accomplished in turn. Logically, a manager cannot set meaningful goals until he knows what is achievable under existing operations. We shall come back to the question of “WHY” a little later. First, let’s look at “HOW” operations should be evaluated, and “WHAT” should be included.

Operations obviously should be evaluated in terms of utilization of money, manpower, machinery, and space. The order of priority of evaluating the use of manpower versus the use of space versus the use of machinery versus the use of money is in itself the first stop in the evaluation process. We must look at all of them in terms of where can we get the “best bang for a buck”.

Utilization of money can be properly evaluated only by those with financial expertise. Inasmuch as this is intended as an operationally oriented session, we shall skip any detailed discussion of how the utilization of money is evaluated other than to express the opinion that the discounted cash flow return on investment technique is best. We shall come back to this also, a bit later.

Utilization of manpower is of paramount interest to all levels of management, because labor costs can amount to as much as sixty-five percent (65%) of the total cost of warehousing and distribution. Evaluation of labor utilization starts with a look at the “numbers”. How many employees are there? What are labor costs as a percent to sales, or as a percent of total value of goods through the warehouse? What is the productivity (pieces or pounds per man-hour) of direct labor? What is the productivity of indirect labor? What are the trends? Are the cost and productivity statistics improved this year over last? How do they compare to two years ago? To five years ago? Just asking these questions is the first step in the evaluation process because the asking mandates an answer and this, in turn, often requires the establishing of a data base and



system for collecting data, and reporting performance. Strangely, labor reacts (not always favorably) to the monitoring of costs and/or productivity. It is not unusual to see immediate improvement, sometimes as much as 10%, just by initiating a data collection and evaluation system, never mind any “follow-up”.

If you have established your data base and have monitored your labor utilization for a reasonable period of time, you have no doubt arrived at a point where you are dissatisfied with your findings. i.e., You are not absorbing wage and fringe benefit increases with increased productivity. At this point you obviously need to go beyond the statistics and see what is actually happening. Here a systematic approach is vital.

The first step is to develop an accurate layout of the warehouse. It should be drawn to scale and show the conditions within the operation as they exist. This layout should show racks, aisles, offices, battery rooms, fork truck maintenance, and all the various activity areas including docks and staging areas. This then becomes our basic tool. A number of prints should be made as we will be using them for different purposes. Warning: “MAKE YOUR SCALE AS LARGE AS POSSIBLE” as there is nothing worse than trying to fill in data on a “skimpy” piece of paper. Next, during a period of normal activity, mark on the drawing, where full pallet loads and partial pallet loads are staged and/or stored, and how many are in each location. Where goods are stored in the aisles, mark it down. Note where damage has occurred, e.g., broken boxes, damaged contents, etc. In each area differentiate the approximate square footage allocated to various products and lines. This becomes a preliminary utilization of space picture, which we shall come back to later, as we discuss space utilization. We interject it here only to make the point that space conditions impact labor utilization, and sometimes this impact is significant.

Next, take another print and plot the movement of goods, otherwise known as a “flow pattern”. Remember what goes to where and from whence it came. For different types of product it is advisable to use different colored pencils and you will be graphically impressed with the many potential bottlenecks you will find. Show the movement from the truck dock or rail siding to the storage location and the route through the area to shipping and on to the truck. show the picking areas and the routes for picking orders. Be alert to opposing and/or cross traffic as well as dead ends.

Next, take another print and mark on it the typical allocation of personnel, e.g., order pickers, fork truck operators, receiving clerks, truck unloaders, repack personnel, etc. The number of people should be posted in general zones. These can be shown as male and female, and this is important, as their personal time requirements and labor rates usually differ. Show the location of supervision, administrative and secretarial help. It is assumed that you have a degree of discipline in the operation, but you will be amazed at the opportunities for improvement that will be presented graphically as you develop these layouts.

In addition to flows and congestion of work area, the application of people to the work at hand must be evaluated. i.e., How busy are the people? We recommend a very simple work sampling study of one week duration, during which each employee is observed twice per hour and his activity recorded; working, talking, hunting, being delayed by others, waiting for work, etc. This observation routine should be done on mark-sense cards which can be readily processed by elementary data processing equipment (punch, sort, list) for analysis. The best-qualified person



to make such observations is the individual supervisor of the various areas of activity, so long as he is made aware that the entire exercise is for his own improvement. You will be surprised to see the percentages of time fork truck operators are productive versus that which they are waiting, conversing, traveling empty, etc. Obviously the same applies to the order picker, car unloader, receiving clerk, etc. This work sampling technique is appropriate for both direct and indirect labor.

Our next area of analysis is the paperwork. This is sometimes equally as important as the product flow, because without organization, chaos ensues. Take each type of document and follow its path through the operation, e.g., purchase order copy or bill of lading.

A shipment arrives at the dock. The receiving clerk checks the goods against the bill of lading against his copy of the purchase order. If in order, the goods are consigned to an area in the warehouse and the allocated address is noted on a cardex or in a tab file. The bill of lading and purchase order copy showing receipt of the goods are sent to Accounting, and the account is cleared for payment. Then the information is transmitted to Data Processing, for inventory update.

Again, we are looking at movement. This time it is movement of paper. Get a sample of each and every form and document used in the operation. Take each document and develop a flow diagram for its route through the organization. Plot the various stops and ask why. You will probably find many areas of duplication, and based on a "need to know" philosophy, you will again see areas of potential savings, through elimination, rerouting, etc. The best paperwork is no paperwork at all.

The next step is developing an organization chart covering both management and labor. This is set up by position, function, and shift and should show the line of authority within the operation. The organization chart relates to the paper flow previously mentioned. More importantly, it also relates to management planning that can critically affect the utilization of money, manpower, machinery, and space. Included are such things as balancing work loads, establishing reasonably appropriate service levels and order lead times, scheduling of multiple operating shifts, and proper integration with peripheral activities.

Too many distribution centers have drastically imbalanced receiving patterns. The reasons vary from such things as the economics of "large lot production" to inventory reduction (dumping) by suppliers. Whatever the reason, the effect is the same...overtime requirements on some days and under-utilization of labor on other days. Similarly, order picking and shipping workloads can be imbalanced by an over-zealous "service oriented" marketing manager. The classic example is the chain store distribution center which "must give each retail outlet a delivery by Tuesday". I have seen ridiculous situations where 50% of the weekly shipping workload was programmed to occur during the first workday of the week. I say that if this "policy" is established with the full awareness of the decision maker as to the consequences, so be it! I seriously doubt that such is the case because in most instances we find that the decision maker has not even been apprised of the situation.

In our own evaluations, we find a major factor in the under-utilization of manpower, space, and machinery has to do with unwise scheduling of hours of operations or "shifts". A one-shift



operation invariably requires more equipment and people than a multi-shift operation. This is undoubtedly due to congestion and the human need to “fraternize”. As previously stated, management should analyze the population density within the various areas and keep in mind that the lower the density, the better. (In most cases.) Accordingly, I believe you would find that receiving operations should occur on a different shift.

Having discussed the utilization of labor, we can now move into the next largest cost element appearing on our operating statement: Space.

You will recall that our discussion of making a layout, we advised that posting of pallet loads and partials in each storage area. Typically, a distribution center operation is running at the optimum when 90% of the selective rack reserve slots are utilized, 50% of the space occupied by the picking slots is utilized, 75% of the drive-in or drive-thru slots are utilized, 60% of the forward picking area floor slots are utilized, and 85% of the floor reserve positions are utilized. Surprisingly, these utilization factors will produce an overall cube utilization of the entire distribution center of only 18% to 25% depending on the mix of the above slots, and of course the height of the facility, width of aisles, depth of staging areas, etc. The principal point to remember is that you must chart your operation as it exists, and develop your own PAR for utilization, based on the rack and aisle layout you have as well as the inventory pattern with which you must contend. Other good benchmarks against which you can evaluate your utilization of space relate to the space requirement per pallet position for various types of storages. Our standards tell us that storage space is efficiently allocated when the following conditions are met:

<u>Type of Storage Slot</u>	<u>Space/Pallet Position</u>
3 Deep – 4 High Drive-In Rack	7.0 Square Feet
6 Deep – 3 High Floor Storage	7.5 Square Feet
Selective Rack – 5 High	9.5 Square Feet
4 Deep – 4 High Drive-Thru Rack	8.0 Square Feet
Storage/Retrieval System – 8 High	4.0 Square Feet

How efficient is your layout compare to these benchmarks?

Another factor bearing on the utilization of cube is inventory turnover. (Parenthetically, the financial man can bend your ear for quite a while as to how inventory turnover affects utilization of money.) You should evaluate your turnover in terms of physical volume turnover, and not in terms of money. Furthermore, the storage/picking slot should be customized to the individual items based on cube, velocity, stacking characteristics, etc. Obviously the slot allocation must be reviewed continually.

There are certain standards based on industry “know how” which can be used in your evaluation. These inventory turnover “norms”, for example in the food warehouse, are as follows:



<u>Classification</u>	<u>Inventory Turnover Rate</u>
Dairy Products:	
Eggs	- 250 turns per year
Milk	- 250 turns per year
Cheese	- 30 turns per year
Meat (Frozen)	- 40-50 turns per year
Meat (Fresh)	- 120-150 turns per year
Dry Groceries	- 18-25 turns per year
Produce	- 120 turns per year

What are the norms for your industry?

It should be obvious that your existing storage system was predicated on a projected inventory turnover. If your current turnover, evaluation item-by-item is radically different from that projection, you will find that you are over-utilizing space (at the expense of double handling and increased labor costs) or under-utilizing space. A warehouse relayout is the obvious solution but you do not know this until you are well into the analysis.

The fourth area of evaluation applies to the utilization of machinery of equipment. In these days of highly mechanized warehouses, equipment utilization is of ever-increasing concern. Man-ridden equipment (fork trucks, tugs, stacker cranes, etc.) can be evaluated by evaluating the operators, as we have discussed previously. They can also be monitored by recording devices. Conveyor systems are often turned on and off by people who cannot stand the pace demanded by steady flow. Accordingly, such systems must be monitored by direct observation of discharge points or routine examination of display panels with indicator lights indicating the status of the various conveyor drive motors within the system.

At this point I feel a need to summarize, because I am sure that most of you are asking yourself, "Where does it all end?" (You may even be saying, "When is he going to stop?")

To summarize, we must go back to the beginning. Why must we evaluate our present operations, especially if they are profitable? We must start with the conviction that growth is a prerequisite of success. If the population is growing, our markets are growing. To retain a relative share of the available market it is essential that the business growth follow the population curve. Therefore, it is understandable that our business should increase four to five percent per year just to keep its share at the market. Another aspect of growth is our method of measurement. Growth is measured in most companies in sales dollars. However, inflation depreciates the sales dollars to the extent that a company today must increase its sales dollars by at least five percent per year to absorb inflation. By simple arithmetic, we conclude that business must grow by ten percent per year in actual dollars or five percent per year in real dollars, to remain competitive. How we accomplish such growth is the name of the game.



Another measure of success of our operations is that much maligned word PROFIT. Like it or not, PROFIT is the lifeblood of a business. Without it we obviously will not stay in operation very long. It should be obvious that expense reduction invariably equates to profit improvement, and further, that expense reduction always starts with a critical evaluation of “What’s happening?”

Lastly, irrespective of the numbers, the reason for analyzing present operations is that a successful manager is never satisfied. He is always striving for improvement and looking to the future to achieve it. He knows that he cannot plot a course unless he knows where he is at all times, hence he need for evaluative systems.

Technology in various areas of Materials Handling and Storage has made quantum leaps in the last few years. The advent of mini computers at a reasonable price with programs that can be altered to fit specific requirements bring mechanization within the reach of many. New hardware in the way of narrow aisle fork trucks gives better utilization of space, and in some cases, the possibility to expand volume without new construction. Other possibilities include utilization of the cube by using high stacking in the warehouse, computer controlled guided tractor systems for movement of goods with a minimum of labor, and full automation with storage/retrieval machines and conveyors. The state of the art has come a long way in recent times. These improvements provide for more efficient operations and can help improve your profit picture. With regard to evaluation of any of these possibilities, we remind you of the need for optimum utilization of money, and reiterate that any of these possible improvements must rise or fall by their own incremental return on investment calculated in a discounted cash flow basis.

In the final analysis, we who run a business must be objective enough and aware enough to know that as we evaluate our current operations, we are really evaluating ourselves because certainly, our operations mirror our own philosophy or approach to doing our jobs. If we are not satisfied with our utilization of labor, why have we allowed it to happen? If our docks or storage areas or aisles are crowded, they have become so over a period of time. Why haven’t we caught it before now? The manager who is evaluating his current operations must take off his blinders! He must be free to get at the real source of poor performance with respect to utilization of money, manpower, machinery, and space. If the problems are physical, they can be solved, in time, with a good return on investment. If they are philosophical in nature, or the logical product of too much inventory, excessive service level standards, imbalanced workloads, adversarial relationships with labor, inadequate supervision, etc., then only a change in philosophy will do! The manager who is objectively “analyzing his present operation” knows the difference. He also knows that for a large number of companies, any increase in company earnings must come from expense reduction. We all must tap this tremendous profit potential by renewing our efforts in the evaluation of our operations and ourselves. Can we afford to do less?

