PROCEEDINGS —

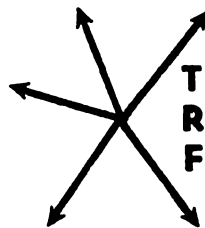## Eighteenth Annual Meeting

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TRANSPORTATION RESEARCH FORUM

Profitability vs. Contribution:
A System for Evaluating Terminal
Contribution Potential

*by Peter K. Siebert**

SOMETIMES MOTOR CARRIERS find themselves in the position of operating terminals once profitable and prosperous, that have since slipped into decline. The growth rate slows and then reverses itself. Management becomes lethargic, then defeatist. Finally, terminal profit becomes breakeven, and then becomes terminal loss.

The reasons for decline in terminal profit are many. Sometimes it is neglect by corporate management. Sometimes it is poor terminal management and sales effort. Often, however, the terminal is located in an area of declining economic activity. Many areas in the old, industrial heartland of the country have been in decline for many years. In some areas, this decline has accelerated in the past six or seven years. Plants and jobs (and freight) have closed or relocated elsewhere.

It is natural to assume that a terminal located in a declining industrial center will slip into decline itself. If the terminal becomes unprofitable, management will begin considering cost reducing measures. The most drastic measure, of course, is closing the terminal down completely.

However, when assessing the profitability of a terminal, there are several factors which must be taken into consideration. The conventional terminal profit and loss statement does not reveal the entire picture as far as marginal costs are concerned. Generally these statements are fully costed, i.e. corporate overhead and transportation costs are charged back to the terminals. Although a terminal may be "losing" money on its P&L Statement, in actuality, it might be making a contribution to corporate overhead and profit. If a terminal is closed down as a cost reduction measure, very little corporate overhead is eliminated. In fact, in larger companies, it is safe to assume that no corporate overhead is eliminated. Therefore, on a company-wide basis, more revenue than cost might be eliminated by closing down a marginal terminal.

The following is a brief analysis of

Temple, Barber & Sloane, 15 Walnut Street, Wellesley Hills, MA.

the effect on Mason-Dixon's total profit if four small, marginal terminals were to be closed down. Keep in mind that this study is trying to determine what total, actual revenue will be eliminated and what total, actual costs will be eliminated. The latter will then be subtracted from the former to determine the effect on the Company profit. Below is a summary of the terminal operating ratios which appeared on the individual P&L's for the year 1975:

Terminal	Ratio
A	113
B	108
C	111
D	109

First, consider what the corporation loses if a terminal is closed. Theoretically, all outbound and inbound revenue to that terminal is lost. In actuality, because of interlining and expanded service from nearby terminals, all this revenue might not be eliminated. However, eventually all the revenue will probably be lost to other companies who serve the points direct. When a company closes a terminal and leaves an area, it generally does so with the expectation of not handling any of this freight in the future. Below is a table of the revenue that would be lost during the year 1975:

Terminal	Total Inbound + Outbound Revenue
A	$ 840,157
B	689,992
C	578,167
D	945,466
Grand Total	$3,053,782

Next, costs that would be eliminated must be evaluated. First, all direct cash expenses involved in operating the terminals will be eliminated. Such expenses as rent, utilities, union wages and office and management wages are included in this category. These expenses are easily identifiable from terminal expense reports. Caution must be exercised so that non-cash expenses, such as depreciation, trailer pool charges, etc., are not in-

cluded. These direct terminal cash expenses for 1975 are listed below:

Terminal	Cash Expenses
A	$216,478
B	117,198
C	111,731
D	167,363
Total	$612,770

The next expense category to be considered is the reduction in breakbulk costs. Different companies charge breakbulk back to the terminals in different ways. Mason-Dixon charges a dollar amount per bill handled through breakbulk. However, this is only outbound freight that is charged, so inbound must also be considered. Inbound transfer charges were estimated by assuming the same ratio as inbound to outbound revenue. If inbound revenue is 75% of outbound, it is assumed that inbound breakbulk costs are 75% of outbound. Care must be exercised that only variable costs are included. Mason-Dixon charges back some platform fixed costs such as supervision and these costs must be eliminated from consideration. Supervisory costs at breakbulk stations would not be affected.

An alternative method would be to determine the actual weight amount of freight handled at breakbulk stations. Divide this amount by a weight per man-hour productivity figure and multiply by an appropriate cost per man-hour. The breakbulk costs are outlined below:

Terminal	Inbound	Outbound	Total
A	$15,401	$15,734	$31,135
B	13,646	14,800	28,446
C	19,620	28,028	47,648
D	26,699	19,511	46,210
Grand Total			$153,439

An argument can be made for the fact that little or no breakbulk costs would be eliminated. The only marginal cost involved would be layoff of dock personnel at the breakbulk terminals. The effect on breakbulk operations of closing four (out of 51) small terminals would be minimal at best. Possibly, no one at all would be laid off. However, less freight would eventually be rehandled and it is expected that personnel requirements would gradually fall to lower levels.

The next factor to be considered is the effect on the remaining terminals of handling reduced amounts of freight. Theoretically, dock handling and pickup and delivery costs would be reduced.

From terminal expense reports, it is estimated that 32% of revenue is consumed in terminal variable expenses handling and delivering freight. It is assumed that 16% is consumed in inbound and 16% in outbound. Therefore, multiplying the four terminals' inbound and outbound revenue by 16% estimates the cost reductions at the remaining terminals. These costs are listed below:

Terminal	Inbound	Outbound	Total
A	$66,486	$67,939	$134,425
B	52,945	57,453	110,398
C	38,088	54,418	92,506
D	87,360	63,914	151,274
Grand Total			$488,603

Again, an argument can be made for the fact that no dock handling and pickup and delivery expenses at the other terminals would be eliminated, because of the relatively small amounts of freight involved. However, it is assumed that other terminal costs would eventually fall to lower levels.

The only remaining costs to estimate are transportation costs. Transportation cost saving would be obtained through a reduction in mileage because less freight would be moving through the system. Therefore, a mileage figure would have to be obtained and multiplied by a cost per mile figure. This can be done by dividing total ton-miles into and out of the four terminals by their respective load averages and multiplying the quotient by $.45. With fuel, driver pay and fringes and a certain degree of maintenance included, $.45 is the present variable cost per mile. No other transportation costs are included because no other costs would be eliminated if four small terminals were closed. Following through the calculations results in an annual savings of $1,317,325, or 6% of total company miles. Unfortunately, this approach to line haul savings is very theoretical and highly suspect.

A more sophisticated method of estimating mileage savings exists. It is in the form of a computer simulation model developed by Logistics Systems, Inc. of Wellesley, Massachusetts. The model is a computer program that simulates the entire line haul system of a motor carrier under operational conditions. The program is input with complete terminal and system information — capacities and hours of operation of terminals, mileage and driving time between all points, freight load plans, all equipment and drivers, and a specified amount of freight. The program will then simulate the operation — loading trailers to specified breakbulk or through load points,

dispatching according to availability of equipment through specified relay points and moving empties and part loads according to service requirements and availability of freight and equipment.

The program can be used to study the dynamic effects of changes to a carrier's operations. How much mileage will be saved if a relay or breakbulk point is moved? What will be the effect on driver and tractor utilization? Can the same equipment handle more freight and how much more? . . . and so on. In this situation, four terminals and all their inbound and outbound freight were removed from the system. What was the effect on mileage? The result: only 2.9% of total miles were eliminated, not the 6% originally predicted. See Exhibits #1 and #2.

Exhibit #1 is a portion of the print-out of mileage by tractor by day of the week. Tractor #12263 ran 639 miles the first day, 122 miles the second day, etc., and 2610 miles for the week. The total is the total mileage for the day and for the week. 204,370 miles were run the first day, etc. Disregard the last column, Period 1. The total company miles run for the week were 1,091,262. In actuality, the Company ran slightly over 1,100,000 miles during the week studied so the program came within 2% of simulating actual conditions. Exhibit #2 is the same outline after the program had been run with the four terminals removed. Total mileage for the week declined to 1,059,929 miles or by 2.9%.

According to the exhibits (and other computer printouts of the study) only direct miles into and out of the four terminals from immediate relay points were eliminated and very little else. 31,333 miles were eliminated and yet 25,470 or most of them were direct inbound and outbound miles. What happened to the truckload and through load miles in the rest of the system? According to the first computer run, 21,336 miles in the middle of the system were attributable to truckloads and through loads in and out of the four terminals involved and yet over 15,000 of them did not disappear. Two explanations for this phenomenon exist. One, half the 21,336 miles were attributable to breakbulk loads. It is reasonable to assume that breakbulk was almost totally unaffected, since the four terminals combined only accounted for 2% of the total freight in the system. Two, resources that carried freight for the four terminals involved were probably used to carry other freight. Thus, although the remaining freight was probably hauled faster, total costs did not change much, because total miles were relatively unaffected.

Although the two mileage estimates differed by only 3.1%, the effects on the contribution analysis are major. The four terminals go from modest to significant contribution. See the tables below:

TON-MILE ANALYSIS

Revenue		$3,053,782
Terminal Costs	$612,770	
Breakbulk Costs	153,489	
Other Terminal Costs	488,603	
Line Haul Costs	1,317,325	
Total Costs		$2,572,137
Contribution		$ 481,645

COMPUTER ANALYSIS

Revenue		$3,053,782
Terminal Costs	$612,770	
Breakbulk Costs	153,489	
Other Terminal Costs	488,603	
Line Haul Costs	643,511	
Total Costs		$1,898,323
Contribution		$1,155,459

Considering that the breakbulk and other terminal cost reductions are also probably on the high side, it is apparent that the four terminals make a significant contribution to corporate overhead and profits. Individually, two of the terminals go from little to modest contribution while the other two go from modest to significant contribution.

Two interesting observations can be made from this analysis. One, motor carrier fixed costs are much higher than generally realized. Two, closing a terminal merely to cut costs is a risky undertaking. True, costs will decline, but not as much as expected and certainly not as much as revenue, even in so-called "unprofitable" terminals.

Market conditions must also be considered. Sometimes a terminal should be kept open in order to maintain market presence. Some "losing" terminals provide the rest of the system with profitable freight even though their own inbound is unprofitable. Suppose all of a carrier's terminals in Massachusetts, for example, were profitable except Boston. It would probably be unwise to close Boston because it is the most important commerce center in Massachusetts. Also, the carrier might be advertising — 'Serving all points in Massachusetts.'

The whole concept also applies to the converse situation — opening a new terminal in a new area. This terminal

TOTAL TRACTOR MILES, BY UNIT, BY DAY CONT.

UNIT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	WEEK 3	PERIOD
12263	639.00	122.00	176.00	675.30	77.00	921.00	0.0	2611.00	2492.00
12264	788.30	566.00	378.00	0.0	95.00	965.00	0.0	2812.00	3104.00
12265	709.00	711.00	137.00	131.00	871.00	620.00	462.00	3720.00	4012.00
12266	936.00	0.0	178.00	520.00	75.00	0.0	675.00	2394.00	2676.00
12267	786.00	800.00	841.00	0.0	0.0	517.00	453.00	3476.00	3771.00
12268	646.00	468.00	1134.00	0.0	577.00	225.00	122.00	3172.00	3932.00
12269	522.00	230.00	171.00	795.00	164.00	142.00	672.00	2697.00	3641.00
12270	807.00	470.00	120.00	423.00	558.00	511.00	378.50	3367.00	3401.00
12271	600.00	485.00	0.0	87.00	0.0	447.00	739.00	2356.00	3118.00
12272	485.00	505.00	0.0	465.00	423.00	0.0	566.00	2632.00	2866.00
12273	709.00	507.00	178.00	95.00	269.00	456.00	207.00	2332.00	2844.00
12274	627.00	329.00	0.0	962.00	481.00	456.00	672.00	3607.00	3926.00
12275	269.00	757.00	0.0	217.00	629.00	336.00	841.00	2923.00	2721.00
12276	473.00	656.00	0.0	463.00	864.00	210.00	947.00	3817.00	4702.00
12277	814.00	128.00	0.0	392.00	122.00	664.00	534.00	1960.00	2724.00
12278	246.00	891.00	95.00	95.00	373.00	0.0	373.00	3199.00	4442.00
12279	812.00	0.0	438.00	563.00	251.00	516.00	418.00	3199.00	4159.00
12280	252.00	453.00	0.0	0.0	906.00	457.00	0.0	2388.00	3614.00
12281	841.00	225.00	665.00	0.0	0.0	737.00	749.00	2731.00	3673.00
12282	748.30	0.0	0.0	770.00	800.00	225.00	0.0	3137.00	4167.00
12283	329.05	453.00	0.0	0.0	846.00	819.00	462.00	2050.00	2811.00
12284	521.00	0.0	0.0	0.0	926.00	0.0	372.00	2120.00	2703.00
12285	373.00	450.00	0.0	225.00	359.00	0.0	0.0	1447.00	2665.00
12286	453.00	0.0	0.0	293.00	228.00	378.00	42.00	1394.00	2324.00
12287	373.00	675.00	380.00	0.0	672.00	453.00	905.00	3459.00	4755.00
1239E	671.00	557.00	0.0	0.0	516.00	856.00	0.0	2600.00	3559.00
12289	773.00	334.00	0.0	0.0	672.00	600.00	336.00	2724.00	3116.00
12290	120.00	629.00	0.0	0.0	624.00	875.00	130.00	2336.00	2050.00
12291	120.00	504.00	0.0	644.00	350.00	921.00	745.00	3234.00	3552.00
12292	0.0	120.00	233.00	340.00	340.00	0.0	0.0	1033.00	1301.00
12293	536.00	156.00	0.0	0.0	0.0	0.0	0.0	734.00	1365.00
12294	528.00	468.00	704.00	876.00	373.00	0.0	172.00	3081.00	3314.00
12295	926.00	252.00	225.00	0.0	517.00	373.00	0.0	2343.00	2693.00
12296	873.00	373.00	122.00	0.0	269.00	970.00	365.00	2675.00	2975.00
12297	742.00	0.0	471.00	188.00	602.00	407.00	679.00	3044.00	3044.00
12298	841.00	122.00	122.00	0.0	746.00	258.00	631.00	2720.00	2453.00
12299	806.00	461.00	0.0	0.0	0.0	0.0	955.00	1619.00	1919.00
12300	745.00	834.00	0.0	0.0	619.00	0.0	768.00	2000.00	3471.00
TOTAL	204270.00	152234.00	94765.00	127914.00	169488.00	172472.00	170015.00	1071262.00	1278912.00

TOTAL TRACTOR MILES, BY UNIT, BY DAY CONT.

UNIT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	WEEK 3	PERIOD
12261	660.00	800.00	336.00	292.00	228.00	841.00	0.0	3317.00	4007.00
12262	500.00	518.00	0.0	0.0	45.00	760.00	665.00	2538.00	3266.00
12263	348.00	778.00	0.0	0.0	340.00	0.0	0.0	2138.00	3234.00
12264	494.00	171.00	0.0	672.00	1091.00	672.00	672.00	3789.00	4147.00
12265	384.00	0.0	0.0	699.00	274.00	0.0	754.00	2113.00	2590.00
12266	754.00	369.00	494.00	701.00	389.00	0.0	505.00	2636.00	2623.00
12267	1021.00	387.00	665.00	105.00	372.00	199.00	169.00	2853.00	3147.00
12268	328.00	702.00	0.0	0.0	122.00	0.0	122.00	1275.00	1557.00
12269	402.00	170.00	273.00	0.0	563.00	1068.00	336.00	2820.00	3112.00
12270	342.00	485.00	0.0	0.0	465.00	622.00	909.00	2843.00	3135.00
12271	468.00	846.00	0.0	584.00	373.00	0.0	697.00	4020.00	4312.00
12272	560.00	233.00	0.0	778.00	0.0	0.0	943.00	2514.00	3174.00
12273	813.00	373.00	258.00	0.0	258.00	258.00	380.00	2340.00	2472.00
12274	704.00	897.00	0.0	0.0	485.00	417.00	0.0	2498.00	2654.00
12275	349.00	0.0	697.00	288.00	340.00	704.00	438.00	2855.00	2975.00
12276	666.00	0.0	290.00	774.00	463.00	328.00	0.0	2551.00	3469.00
12277	806.00	468.00	439.00	128.00	544.00	373.00	0.0	2557.00	3921.00
12278	758.00	250.00	41.00	95.00	620.00	921.00	532.00	3217.00	4131.00
12279	450.00	798.00	292.00	704.00	292.00	537.00	431.00	3504.00	4554.00
12280	0.0	0.0	291.00	399.00	399.00	518.00	0.0	1607.00	2302.00
12281	600.00	472.00	292.00	412.00	523.00	0.0	225.00	2524.00	3052.00
12282	373.00	225.00	292.00	495.00	42.00	714.00	42.00	2183.00	3399.00
12283	396.00	672.00	760.00	438.00	665.00	0.0	225.00	3145.00	3771.00
12284	225.00	78.00	303.00	0.0	225.00	766.00	130.00	1727.00	3024.00
12285	804.00	134.00	136.00	0.0	850.00	399.00	839.00	3163.00	3963.00
12286	921.00	370.00	0.0	0.0	0.0	0.0	0.0	1299.00	2414.00
12287	0.0	383.00	275.00	0.0	424.00	199.00	745.00	1973.00	3049.00
12288	563.00	453.00	0.0	987.00	580.00	0.0	0.0	2593.00	3064.00
12289	428.00	336.00	0.0	826.00	0.0	275.00	665.00	2480.00	3063.00
12290	196.00	336.00	378.00	378.00	672.00	213.00	0.0	2173.00	3177.00
12291	600.00	0.0	495.00	350.00	217.00	0.0	876.00	2532.00	2660.00
12292	466.00	0.0	687.00	139.00	378.00	0.0	756.00	2414.00	2419.00
12293	698.00	553.00	783.00	230.00	570.00	52.00	1031.00	3267.00	3567.00
12294	804.00	755.00	558.00	804.00	136.00	0.0	822.00	3650.00	3650.00
12295	575.00	755.00	558.00	804.00	136.00	0.0	822.00	3650.00	3650.00
12296	459.00	495.00	0.0	0.0	0.0	0.0	465.00	1445.00	1449.00
12297	576.00	0.0	233.00	921.00	0.0	672.00	826.00	3229.00	3229.00
12298	838.00	841.00	540.00	269.00	665.00	0.0	826.00	3355.00	3355.00
12299	622.00	890.00	969.00	754.00	553.00	665.00	275.00	4453.00	4453.00
12300	600.00	472.00	225.00	517.00	453.00	826.00	0.0	3092.00	3302.00
TOTAL	173132.00	161944.00	95539.00	127123.00	166562.00	162689.00	172939.00	1059929.00	1257031.00

might be a loser for quite some time due to lack of freight. However, it should be given sufficient time to get known in the area and to carve out a market share. Generally, at least a year should be allowed for this accomplishment.

Only after the foregoing analyses have been made and when available assets (equipment, personnel and capital) at marginal terminals can be more productively utilized in another location should closing a "loser" be considered.