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Data Processing Analysis of the Penn-Central Merger

I. BACKGROUND

On March 9, 1962, the stockholders of the Pennsylvania Railroad Company and the New York Central Railroad Company approved a proposed merger plan, the consequences of which would be the formation of the Pennsylvania-New York Central Transportation Company. The Interstate Commerce Commission received a petition regarding the proposed merger shortly thereafter. The Commission hearings began in August, 1962, and concluded in October, 1963. The Commonwealth of Pennsylvania authorized the present study to ascertain with what results the proposed merger might affect the economy of the Commonwealth, communities, shippers, and employment, among other matters.

The Commonwealth's Interdepartmental Committee to Study the Proposed Merger recognized particularly the following points:

(1) It is assumed that any operational plan, including the present unmerged plan, has both beneficial effects and also some adverse effects.

(2) The study is a completely new and novel action on the part of the Commonwealth: computer simulation techniques have never before been used in analyzing economic impact of a proposal such as this merger.

If computer simulation is to be used as a tool to analyze the consequences of this merger, it is most important that the general philosophy underlying such analysis be clearly pointed out and understood by the users of the study. Social scientists are little different from others who attempt to discuss and analyze the future in their general level of fallibility. Where they *are* different, the difference lies in their better understanding of those economic variables which have had a demonstrated importance in analogous situations throughout history. But another, perhaps more important difference, lies in their recognition that in their field, single point estimates of the future almost always miss the mark. Rather, *ranges* of possible realistic assumptions would have to be made concerning the operation of the merged railroad, and the probable and possible economic impact of each of these traced out in turn. A continuation of the railroads' present pattern of operations, resulting from a rejection of the merger application, would be among the alternative assumptions made.

Several prospective advantages of the merger have been widely presented. It is important that the model which is used to analyze the merger include the following aspects:

1. Centralization and modification of joint classification yards.

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2. Concentration of through traffic on more direct and efficient routes.
3. The reduction of interchanges.
4. The use of the best access tracks and terminal facilities.
5. Consolidation of schedules.
6. Improved service.

The heart of the simulation exercise was, of course, the model of the affected railroads and economy in which they operate. The model required information about:

A. The system mission: freight carried.
B. The system attributes: physical characteristics
C. The system functioning: operations

The general philosophy of the study was to demonstrate 'possible worse affects' and also 'probable beneficial and adverse effects' (with some estimate of the confidence one might place in these estimates) resulting from each of these alternative plans. It is important that the 'worst possible effects' on the Commonwealth be examined because (1) if such effects are likely to occur, the Commonwealth should be prepared to mitigate their impact, and (2) the parties to the merger might themselves carry out the operation in such a way as to reduce potential injuries.

II. METHODOLOGY

A. Description of the Model

The procedure of the study consisted primarily of (1) the background research and side studies which were necessary for preparation of inputs to the model and for analysis of the model's outputs; (2) evaluation studies and documentation of claims made both by proponents and adversaries of the merger; and (3) preparation and interpretation of the computer model. We have already said that the model consists of system mission (freight carried), the physical characteristics of the system, and the operations of the system.

We have limited our study of the system mission to be that of freight rather than both freight and passenger service, because the economic implications are primarily those involved freight; furthermore, the primary potential impacts would be due to changes in freight activity. Under system mission, one may classify the job which the system is designed to do; to carry a variety of freight to and from a variety of places within a territory served by the lines comprising the merged rail network. During the exploratory survey which preceded actual programming of the computer model, an attempt was made to use data from the one per cent waybill sampling obtained by the Interstate Commerce Commission to prepare tabulations of state to state movements by commodity. For the purposes of the model, tabulations were required that showed greater geographic, if less commodity, detail. Preliminary investigation showed that it would be impossible to obtain good tabulations from this source within the time period allowed for the study. Furthermore, the tabulations would have had to be checked for protection against disclosure. Finally, there were many difficult statistical questions involved in the use of the one per cent waybill sample for the purposes which were intended. The alternative was left, therefore, of using the data which were developed especially by the railroads for their own merger studies and proposals. These data would not permit, without considerable refinement and effort, the identification of commodities. Nevertheless, with these original data, the total volume of freight moving between given points on the system was successfully described. Since the commodity differences were not important in the original determination of train frequencies made by the parties to the proposed merger, their example was followed.

The primary input consisted of the number of loaded and empty railway cars moving from each node in the network to any other node, calculated on the basis of the October 1960 and August 1961 experience of the two roads. The number of cars moving was taken to be a daily average and it was upon this average for the most part that the roads relied in proceedings to make up their train frequencies per segment between nodes. Other considerations which were included in their computation, but not the computations of the present model, included distribution of motive power and, for several one segment only, the detailed requirements of ruling grades. In general, terminal facilities and protection of connections were not considered.

The computer program itself consisted of a critical path scheduling (CPS) operation which initially determined the shortest and therefore the theoretically most efficient path in the network between each node from which traffic was moving to each node which was receiving that traffic. Such a least-distance network would be potentially more efficient than any network in actual use for the movement of trains and cars, with the exception of movements which were consistently made over other than rolling grades. It might be added that so far as train consist is specialized, such as non-feed trains, drag trains, and so forth, the potentially greater efficiency of CPS routing might not hold.

In order to calibrate the model itself, it was necessary to adjust the mileage distances between nodes in such a way as to cause the number of cars and hence trains flowing along the segments between nodes to be adjusted so that they matched the applicants' data. It should be clear that such a model as the one being described could realistically represent either the merged railroad or the unmerged properties, but the unmerged properties possess fewer choices of traffic patterns. This is not to say that an unmerged property might not have considerably more efficient critical path routes available than it is actually using in its freight train schedules. It is simply that the amount of inefficiency that it would experience as a result of failing to use critical path techniques would presumably be much less than what would be experienced by a merged road which failed to use these techniques.

The merger proposal put forth by the applicants is but one of many possible traffic routing plans for the operation of the system. Given the data on freight movements and the characteristics of the system, it should be possible to make alternative routing plans which could be realistically carried out after merger. Much care has to be taken in the selection of such alternatives, since they are theoretically very large in number. But some likely candidates do suggest themselves as we shall see below.

The chief output from the computer model when it was further adjusted to permit alternative traffic patterns to be realized was initially, of course, cumulated flows of cars per segment and, based upon such flows, freight train frequencies. These frequencies were interpreted as the average number of trains per segment per day of the original sample period.

Tonnage restrictions were brought into play in the latter stages of the programming by means of data for the segment lying between each pair of nodes which related the number of units of locomotive power to the number of tons and number of cars being hauled. This was then applied to the traffic computed for each segment in the model for the purpose of identifying any segments which had overloads of tonnage per train, taking the historical experience of the railroads into account. The number of tons per empty car was taken to be 24 on the average, while the number of net tons per loaded car was taken to be 45. An average of three locomotive units per train was taken to be standard.

It should be noted that the critical path scheduling technique employed in the present model did not treat what might be called the 'train formulation' problem. Train formulation in this sense refers to testing whether a train should be sent as a single entity from any given node to any other node strictly as a consequence of sufficient traffic being accumulated to justify the sending of said train. Rather, the CPS technique enumerates the number of full tonnage trains that would be found to flow on any given segment strictly as a consequence of the cars assigned to that segment and the grade/curvature restrictions. Therefore, train formulation must be handled separately. In the present situation, limitations of time and computer allocation made it impractical to make these calculations.

Trains which constitute bridge traffic, and which are thus not called upon to make stops at intermediate nodes in their path, accumulate less total elapsed time than trains which make stops. This distinction would apply also to assignment of crews and would affect the bookkeeping subroutines which would do accounting for the associated costs. For the above reasons, it is suggested that a still higher level of aggregation than the one which has been described here might be needed for the resolution of train formulation aspects. For this purpose 24 nodes would perhaps be successful.

The utility of such a highly aggregated model has not been fully explored and the suggestion that aggregation to 24 nodes be undertaken is made in the full light of this fact. Such aggregation should yield, however, statistical operating characteristics which could be highly useful as measures of performance of the merged system as it would operate given various managerial alternatives of traffic pattern.

B. Model Outputs

We may list some of the outputs from the present simulation model as follows:

(1) Trains per segment
(2) Train-miles per segment
(3) Ton miles per segment
(4) Car miles per segment

From these outputs it was expected that certain indices of system cost and selected attributes of railroad service could be derived. The model, once it was validated against the original study, was then run with substitute segment mileages which would test the following path alternatives:

(1) Applicants' proposal: use of Mohawk Valley route in New York State.

(2) Alternative option: use of Pennsylvania main line for major East-West shipment.

Each of these operational path alternatives should be associated with interchange, delays, and terminal facility requirements.

Additional outputs from the model were derived from changes made to the origin/destination data of freight movements which were originally supplied by the railroads. The use of their 1960-1961 data should not be discredited because of excessively large freight movements which occurred then, relative to other months, because larger freight movements of themselves are not necessarily favorable to merger. For example, it is by no means clear that merger savings would be either absolutely or relatively greater merely as a result of employing inflated as against depressed seasonal flows. On the other hand, potential service detriments might not be reflected so clearly when using data and information from higher freight months.

The primary problem, however, in using railroad data, is not the plus or minus 5 per cent difference which would result from using one month as against another so much as it is the result of a substantially greater differential between the same month of two different years. For example, the percentage difference between the average of 1956-1960, and 1961, in terms of ton miles of revenue freight, was almost 10 per cent. The five-year average 1941-1945, as compared to 1936-1940, showed a differential of almost 50 per cent in terms of ton miles of revenue freight carried. No two periods would, of course, be expected to be exactly alike, but one should expect that in five years the gross tonnage to be carried by the railroads would surely vary by more than 5 per cent from the levels presented in the applicants' 1960-1961 data.

Although there are indications, as we shall see below, of railroad revenue trends, there was doubt that the cross-section 1960-1961 figures are by themselves good predictors of the future. Therefore, it was decided to make extrapolations from time series data of various commodity types which are of importance in railroad freight operations, making the assumption that the proportion of total carriage which these commodities represent today will be continued over the forecasted intervals. The summation of the commodity activity based on five and twelve year forecasts to both 1968 and 1970 served as the guide to adjusting the origin/destination traffic in the computer model, so that changes of mission, as they were interpreted from the model, were as relevantly realistic as possible.

Before leaving this section, other types of data used in the study should be acknowledged. These included teletype consists from both the New York Central System and the Pennsylvania Railroad, freight train performance reports from the Pennsylvania Railroad, summaries of waybill and wheel reports and maps, plans, financial statements and related materials provided or published by the railroads, the Interstate Commerce Commission, and many others.

III. RESEARCH ON INPUTS TO THE MODEL

It has already been stated that the heart of the simulation exercise was to consider the freight carried, the physical characteristics of the railroad (which would include their geography), and their operational rules.

The freight carried was expressed as the number of cars (loaded plus empty), assigned to move from each node to each other node. The data were obtained from specially prepared traffic summary sheets. For the computer study, the node determinations were made by comparing the 131 places stipulated on the Pennsylvania Railroad with the 179 places stipulated on the New York Central System, with the effect (together with certain further simplification) that 200 nodes resulted.

On this network, entries were made showing the number of cars that were computed to move over each segment in accordance with the critical path program, and these computed least-distance results were then compared with the post-merger results which appeared in applicants' testimony. Adjustments to the segment mileages were then made, to correct the least-distance flow to being the flow obtained by the 'put-and-take' manual technique used by the merger committee of the railroads.

The logic of this type of analysis, to get at transportation costs and policies, is predicated primarily upon the well-accepted procedure of 'desire line analysis,' which presents the travel or shipping needs for freight generating areas on the basis of straight line flow between any two points regardless of route. The merger study done by the railroads relied primarily upon this form of initial analysis, and upon the resultant traffic patterns, for the justification of the transportation cost savings, which arose from the newly available paths and combined totals of traffic to be moved.

Once the procedure of desire line analysis was validated for present purposes, it was clear that the next step was to consider the possible choices of traffic paths that were open to the officers of the merger. The total system path which they announced in their post-merger data depended on a combination of three things: (1) an overt choice of path—i.e., an artificial constraint—so that eastbound traffic for New York City, flowing north of an 'arc' which connected Columbus and Youngstown, Ohio; Warren, Williamsport, and Wilkes-Barre, Pennsylvania; and Linden, New Jersey, would be diverted to the water-level Mohawk Valley route of the New York Central System; (2) a less obvious attempt to combine eastbound traffic west of Pittsburgh into a least-path traffic pattern similar to the critical path scheduling output of the computer program, but with almost zero probability of accomplishing that optimal distribution precisely; and (3) traffic data itself.

It may be fairly stated that in the applicants' own study of their transportation problem, they used a (necessarily) incomplete and imperfect, manual critical path method to evaluate possible transportation savings. This method was described by operating railroad personnel as sending the 'largest amount of freight as far as possible with stopping.'

Therefore, if the railroads act within a framework of consistently 'valid' forecasts of demand, they may approach but never exceed the savings in transportation that were obtained by the critical path scheduling method used in the present study. Since this is true, the economic benefits of this 'best' set of path choices and traffic patterns should be weighted against the benefits and costs of any other choice of path by modifying the direction of flows arbitrarily. The substantive argument for this is simply that the grades of the Pennsylvania path may not be a dominant determinant of costs, as may be deducted from a comparison of New York Central and Pennsylvania Railroad transportation cost statistics on an equated ton-mile basis.

The point was, to what extent was the artificial constraint of the 'arc' justified, given that the data were appropriate, and properly treated, which we believed was the case. In effect, one may say that the larger fixed crew costs in New York State, plus the longer distances for many of the mid-western cities to New York City via the water level route, and level grades, compete in efficiency with the shorter distances via Pennsylvania, set off by mountain grades and higher terminal costs in the New York City area if Pennsylvania is used as the main path.

It has been our responsibility to examine carefully the economic distinction of these two possibilities (the south-of-arc and north-of-arc constraints). We may state unqualifiedly that the road system at its very best could not improve on the savings in the purely transportation side by exceeding the reduction in train, car or ton miles (considering all cars and trains homogeneous and not specialized) as determined by the present critical path scheduling program.

We have already mentioned that the constant origin/destination workload of the railroad waybill sample was correct only for that period of time and undoubtedly not 'true' for any time period since. Therefore, while the simulation model was run with the original data, these have also been varied, as they might be in 1968 and 1970, as a function of forecasts of Pennsylvania Railroad and New York Central Railroad commodity flow. Our procedure was, simply, to pilot revenue received for each of the top-ranked commodities on each of the railroads (in 1961) for the years 1950 through 1961. Four projections were then made for each of these commodities: for both 1968 and 1970 forecasts were prepared based on five and on twelve years of data (1957-61 and 1950-61 respectively). The latter allows one to weigh the recent past more heavily.

Since our interest in running the simulation model was not in the analysis of individual commodities, *per se*, but rather in the overall mission expected in these future years for both railroads combined, we then aggregated these individual commodity projections to arrive at overall percentages—bottom range, medium range, and high range—against which the original data were applied and run through the simulation model. The differences, of course, were considerably greater than the less than five per cent difference than October 1961 represented as a monthly seasonal departure from the other months of 1961.

It is obviously not possible to assign a specific probability of actual occurrence to any of the mission projections just cited. Nevertheless, it is the range within which examination of feasible train frequency, system cost, system savings resulting from merger, train miles and many other measurement of system performance and cost should be compiled. If, within this range, the merger produced significantly better performance as measured along these dimensions, the merger, if approved, has a much greater probability of achieving its many objectives. On the other hand, were this not the case, more intensive analysis of the probable trends affecting each of the major commodities on each of the railroads would have to be studied a good deal more extensively.

There are other adjustments which could be made using (1) different gross national product projections; (2) regional and/or state-to-state changes over time; (3) introduction of certain technological changes as they might affect the freight carried in each commodity category.

Such projections would be useful only where they were projected as ranges and where the implications of varying values within this range, as measured against several dimensions of performance and cost, could be obtained.

IV. SYSTEM COSTS AND THE PROPOSED MERGER

It has been acknowledged many times that railways as an industry have perhaps the most difficult costing assignments. These difficulties arise because of measurement problems, the nature of railway operations, the substantial expenses which are common to the production of joint services, and by-products.

It was decided that the system average costs used by railroads themselves for decisions form a feasible if not ideal substitute for measuring costs which are directly variable by segment. The system average cost of fuel, for example, fell into this category, so that plans to conduct an actual experiment to determine fuel requirements for operation on flat territory as compared to grades, were cancelled. The reasons for this were twofold. First, as a component of total operating costs, fuel is so much less important than other direct costs that it is feasible to regard it as a system average or unit cost, neglecting the variation between grades and flat territory energy consumption; and second, the stability of system costs (when many segments are being studied together) must, by every reasonable standard, be much greater than 'segment' costs, in the face of fluctuating traffic.

Costs per train mile, as reported by adversary's testimony, were derived from crew and locomotive unit costs. These reported that the ratios for this datum were $2.25 and $2.23 for the PRR and NYCS, respectively. Costs per freight service unit (revenue gross ton mile) were reported (1960) to be .237247 and .229184 cents, respectively, for the PRR and NYCS. These latter figures are unlike the equated ton mile, which is not now highly regarded by the roads as a cost statistic.

Further discussion of costs is contained in the Conclusions where indices are presented based on:

(1) The relative proportion of train miles carried over each road under the alternative systems;

(2) The relative proportion of total gross ton miles and total revenue gross ton miles carried over each road under the alternative systems;

(3) The relative difference, between CPS I and CPS II, in train-miles and ton miles.

The cost indices are then applied against the relevant dollar costs of the lines to estimate the net differential between applying CPS I — that system which moves through Pennsylvania more like the pre-merger system but minimizing ton and car miles of the lines involved — or CPS II, which is the computer model close approximation to the applicants' proposed plan for merger.

V. CAPACITY CONSIDERATIONS

To appraise the need for suggested changes, freight train performance reports for a particular period were analyzed. In Table 5.1 train delays are ranked in order of frequency. It will be noted that delays for trains ahead was the single most important source of delay in the system, and this source of delay has therefore been tabulated as a fraction of total trains dispatched, again for eight of the nine operating regions of the Pennsylvania Railroad:

TABLE 5.1

Operating Region	Delays for Trains Ahead	Trains Dispatched
Pittsburgh	109	446
New York	90	353
Northwest	52	313
Buckeye	73	263
North	28	95
Lake	22	221
Philadelphia	74	434
Southwest	14	159
Chesapeake	(Not Available)	
Total Trains	2284	

The indication is that capacity restrictions and quality of right-of-way are not significant factors in train service such as would justify large expenditures on that particular account, in this instance. Further information on this point is contained in Table 5.2 which shows the average time for set-offs and pick-ups in *excess* of scheduled allowances, according to Pennsylvania Railroad operating region:

TABLE 5.2

Delays in Excess of Published Freight Train Schedule, Ranked in Order of Decreasing Frequence

(Denominator is Total Delays Observed During the Period, Week of March 3 - March 9, 1963)

Rank	Cause of Delay	Frequency	Percentage of Total Delays
1	Trains Ahead	462	22
2	Set-Offs and Pick-Ups	400	19
3	Late for Power	270	13
4	Mechanical Failure - Cars	180	8
5	Filling Out for Weight	175	8
6	Maintenance of Equipment & Shop	113	5.4
7	Connections	102	4.9
8	Inspection	96	4.6
9	Mechanical Failure - Engine	72	3.5
10	Mechanical Failure - Roadway	55	2.7
11	Crew	45	2.2
12	Late Arrival	44	2.1
13	Heavy Train	42	2.0
14	Weather	31	1.5
15	Derailment	30	1.4
16	Miscellaneous	6	.2
	TOTAL DELAYS	2073	100.5*
	TOTAL TRAINS	2284	

*Does not add up to 100 due to rounding

TABLE 5.3

AVERAGE HOURS SPENT IN SELECTED YARDS, PER FREIGHT CAR
NEW YORK CENTRAL SYSTEM

1962 WINTER MONTHS	R. R. YOUNG (E)	WEEHAWKEN (F)	BIG FOUR (E)	AIRLINE (F)	SHARON (P)	SELKIRK (H)	SUSPENSION BRIDGE (F)	STANLEY (H)	ROCKPORT (F)	COLLINWOOD (H)	DEWITT (A)	BUFFALO (A)	
JANUARY	18.2	16.0	10.9	11.3	19.2	12.1	11.5	19.9	22.4	12.0	19.1	13.5	15.5
FEBRUARY	19.4	18.0	10.6	14.5	19.8	12.3	11.4	23.4	25.5	11.8	18.5	13.3	16.5
MARCH	18.0	19.2	10.7	12.1	18.9	14.8	11.0	23.7	20.5	10.5	17.6	12.6	15.8
APRIL	16.0	16.3	11.2	10.0	17.3	11.7	11.5	18.7	19.8	9.9	15.7	13.5	14.3
NOVEMBER	16.5	17.1	11.5	11.1	21.0	14.5	12.6	19.3	19.4	10.6	16.3	13.8	15.3
DECEMBER	19.9	20.0	11.7	13.5	25.1	17.9	12.8	25.2	27.5	13.5	17.2	15.1	18.2
AVERAGE	18	17.7	11.1	12.0	20.2	13.8	11.8	21.7	22.5	11.3	17.5	13.5	15.9

Type of Yard:
A - Automatic E - Electronic
F - Flat H - Hump
P - Partly Mechanical Hump

Source: New York Central System Classification Yard Elapsed Time Reports

Furthermore, it was found that, as shown below, the average time for set-offs and pick-ups (again in excess of schedule) was:

(1) Buckeye Region	24 minutes
(2) New York Region	42 minutes
(3) Southwest Region	36 minutes
(4) North Region	36 minutes

(5) Lake Region	48 minutes
(6) Northwest Region	38 minutes
(7) Pittsburgh Region	34 minutes
AVERAGE	37 minutes

Finally, Tables 5.3 and 5.4 indicate how comparable is the yard time of freight cars, even as between yards of modern and of obsolete design. Of course the data regard the trains as homogeneous, and disregard individual priorities, so that the obvious conclusion that classification yards are homogeneous is not necessarily correct. Nonetheless, the figures do indicate that yard delays are more of an obstacle than line-haul delays.

VI. CONCLUSIONS

Briefly, we may recapitulate our findings as follows:

1. The merger applicants did a good job in studying the reduction of transportation costs insofar as they selected the New York State route for main east-west traffic. The methodology, for any one 'merger option' studied, has been scientifically verified.

2. The merger applicants did not examine the specific transportation costs had the Pennsylvania main line been chosen for the bulk of consolidated east-west traffic movements. The present study indicated that this was a possible alternative, economically speaking, and should be examined in detail to substantiate or to disprove its acceptability. Table 6.1 summarizes these findings.

3. The railroad proposal as made is not necessarily fixed (stable), nor can perfect predictions of future traffic loads be made. Optimistic and pessimistic forecasts should (as in the present study) form an integral part of any future merger studies.

4. A detailed study of the option to move consolidated traffic through the State of Pennsylvania must include tabulation of the necessary fixed investments as well as the traffic (transportation) costs that would be associated with this path.

5. Estimates of schedule changes to accommodate the traffic that would be flowing east-west should be made, in order to test whether the Pennsylvania option proved suitable for shippers in New York State.

6. The further development of measures of rail performance standards, and associated conciliation costs between the roads and their customers, should be emphasized.

7. Delays and congestion in the New York City area, and the relation, in general, between principal east-west routing and connections with third carriers (non-applicant railroads) should be studied. Capacity of the proposed merged line appears not to be a technical problem at all.

8. The proportion of cost incurred as a result of moving trains over the Pennsylvania mountains should be estimated more carefully than has been the case to date.

TABLE 5.4

AVERAGE HOURS SPENT IN SELECTED YARDS, PER FREIGHT CARS

NEW YORK CENTRAL SYSTEM

1962 SUMMER MONTHS	R. R. YOUNG (E)	WEEHAWKEN (F)	BIG FOUR (E)	AIRLINE (F)	SHARON (P)	SELKIRK (H)	SUSPENSION BRIDGE (F)	STANLEY (H)	ROCKPORT (F)	COLLINWOOD (H)	DEWITT (A)	BUFFALO (A)	
MAY	16.3	17.3	11.5	10.0	20.2	12.4	11.1	19.2	20.4	11.1	17.8	13.0	15.0
JUNE	15.6	17.5	10.8	10.6	20.6	10.0	10.5	15.4	19.9	9.2	16.7	13.1	14.1
JULY	17.0	17.1	11.1	11.0	17.5	12.7	9.4	17.8	18.9	9.8	16.8	13.5	14.3
AUGUST	14.8	14.7	11.0	9.3	19.5	16.7	11.3	16.7	19.4	10.6	17.0	13.2	14.5
SEPTEMBER	16.9	13.3	11.0	9.8	19.1	10.9	11.7	16.7	17.3	10.3	16.9	14.1	14.0
OCTOBER	16.8	13.6	11.2	9.2	21.5	12.5	12.8	17.3	17.6	10.0	16.1	14.8	14.4
AVERAGE	16.2	15.9	11.1	9.9	19.7	12.5	11.1	17.1	18.9	10.1	16.8	13.6	14.4

Source: New York Central System Classification Yard Elapsed Time Reports

9. The correlation, if any, between rail traffic and employment should be more completely explored. No provable damage to industrial development in Pennsylvania, under the proposed New York option, has been dem-

onstrated, although the industrial 'access coefficients' indicated potentially significant comparative advantages to New York industry under this option.

10. Financial savings to the applicants would almost certainly be greater than predicted by the applicants. These savings would redound eventually to the benefit of the State of Pennsylvania.

11. A study of pending legislative transportation measures should assess the potential effects that would be experienced if merger preceded their enactment.