

ment sometime during the programming year but not awarded. Many of these projects were brought forward from previous years and many were carried over into FY 83. However, many were added to the annual element through amendments and many awarded projects were added to the annual element through amendments. The implication is that staging of projects for eventual award is not occurring. Rather, programmers are maintaining a large set of annual element projects from which to select for potential award. This appears to be an effective means of programming for maximum advantage in a dynamic and unpredictable funding environment.

However, cost differentials are great between the

original and final annual elements as well as between the final and awarded program. On average, projects are awarded at lower than programmed costs, but the percentage differences between programmed and awarded costs are high. This suggests that significant changes in scope are occurring but that changes in any individual project are counterbalanced by changes elsewhere in the program.

REFERENCE

1. FY 83-87 Transportation Improvement Program for Northeastern Illinois. Chicago Area Transportation Study, Chicago, Ill., 1982.

Pennsylvania Priority Commercial Network: Development and Applications

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ABSTRACT

The development and application of Pennsylvania's Priority Commercial Network are documented. The Priority Commercial Network encompasses approximately 12,000 miles of roadway of the greatest importance to commerce in Pennsylvania. The roadways identified carry traffic of more than 500 trucks per day or are connector roads for specific regional industries such as coal. The methodology used in network development, coordination efforts, and the physical aspects of the system are described. Major findings with respect to weight-restricted bridges, long steep grades, and truck incident locations are analyzed as they pertain to commercial restrictions. The Priority Commercial Network has served its intended purpose as an effective decision-making tool in highway and bridge program development as well as in several other key departmental initiatives: (a) innovative bridge funding legislation, (b) identification of an agricultural access roadway system, (c) pavement management, (d) measuring agency performance, and (e) setting department objectives.

The Pennsylvania Department of Transportation (PennDOT) has undertaken a new initiative to facilitate a program development process consistent with the goal of promoting commerce and economic development by focusing decision making on goods movement by truck. Highlighting the network of highways that is frequently used by commercial truck traffic enables the

department to efficiently identify deficiencies that deter commercial truck travel.

The Priority Commercial Network (PCN), which consists of all major truck routes throughout Pennsylvania, was identified as the base system within which to specify major areas where restrictions to commerce occur or are about to occur. Analysis of this network provides a view of the performance of the highway system and a framework within which to measure the performance of the highway and bridge programs. It is a basis for evaluating district and agency performance in delivering products that effectively address the key objective area of highway commercial transportation. Deficiencies identified on the PCN are prime candidates for projects to be input to the PennDOT twelve-year program. The information obtained from monitoring the status of projects or potential projects located on the PCN can be used as input to evaluation of the performance of the highway and bridge programs.

The PCN has had direct influence on key department initiatives in pavement management, setting objectives, and evaluating farm-to-market roadways.

METHODOLOGY

The initial task in this study was to develop a statewide system of highways and bridges that are of the greatest importance to truck travel. Information on the volumes of truck travel in Pennsylvania was obtained from the PennDOT truck monitoring program and from the most recent information contained in traffic information files.

The basic system was identified as the set of road segments across the state with average daily truck traffic (ADTT) of 500 or more. This basic system was stratified into four levels of ADTT (500 to 1,000, 1,001 to 3,000, 3,001 to 5,000, and > 5,001)

and one level designated Interstate. An additional level of roads (priority connectors) with ADTTs less than 500 was added in areas where available information showed volumes fluctuating above and below the 500 ADTT level or where a highway was considered to be of regional importance to commerce even though its level of truck traffic was below established parameters.

Major coal-haul routes were also added as a supplement to the basic PCN. The 2,900-mile system of coal-haul routes identified in the 1981 Core Coal Haul Study was the basis for these additions. The initial Priority Commercial Network identified totaled 9,500 miles.

The constraints to commercial travel that were identified on the network included deficient bridges, high truck incident locations, and long steep grades. Deficient bridges on the network (sufficiency rating < 80.0) were extracted from the Structure Inventory Records System (SIRS) data base and include bridges that are either structurally deficient or functionally obsolete. High truck incident locations were defined as locations with 10 or more truck-related accidents during the most recent 3-year period. These locations were derived from the PennDOT accident record system. Finally, the long steep grades on the network were identified according to a department study that incorporates grade, daily truck volume, and truck accident data in classifying long steep grades.

COORDINATION

The objective of the coordination phase of the study was to draw on local and regional perspectives to refine the initial state-level definition of the Priority Commercial Network and its associated constraints. This phase was also intended to use local and regional input to identify key access points to the priority network.

Metropolitan planning organizations, district offices, regional planning agencies, and other local and regional organizations were consulted during this phase. In addition, as the study progressed, other advisory and local interest organizations became involved in the review process. The suggestions and comments that ensued from these coordinative efforts were incorporated, where appropriate, as revisions to the initial network. As a result of these coordination efforts, the Priority Commercial Network of state-owned roads increased by 17 percent to a total of 11,457 miles. Because of constant highway improvements and changes, the PCN definition and

constraints are reviewed and revised at timely intervals.

PHYSICAL ASPECTS

Through the use of special data base indicators, the PCN was integrated into the PennDOT roadway information system of all state-owned highways. Pennsylvania owns approximately 45,000 miles of highways; thus the PCN comprises approximately 25 percent of state-owned mileage. Simple computer programming techniques allow PennDOT to view physical aspects of the network from a statewide or regional perspective at any time.

Various characteristics of the PCN are presented in Table 1:

- More than one-half of the PCN has truck volumes of between 500 and 3,000 trucks per day,
- The Interstate system comprises approximately 10 percent of the mileage, and
- The PCN is made up of 26 percent rigid base roadways, 32 percent flexible base roadways, and 42 percent composite roadways.

According to pavement serviceability ratings (Table 2):

- Thirty-six percent of the network is in good condition, 60 percent is in fair condition, and only 4 percent is in deteriorated condition.
- Over 7,000 miles of the PCN have been resurfaced since construction.
- As shown in Figure 1 and Table 3, 98.8 percent of the PCN is on a federal-aid system.
- Seventy-four percent of the system is rural, and 26 percent is located in urban areas.
- Two-thirds of the network is on the federal-aid primary system.

FINDINGS

The analysis of Pennsylvania's Priority Commercial Network proved extremely valuable in the development of the PennDOT highway and bridge program. Network findings indicate that a new level of information and understanding, heretofore unavailable to decision makers throughout PennDOT, can be provided by the commercial network analysis. The framework provided by this information is viewed as both defensible and objective.

TABLE 1 Statewide Highway Mileage on the PCN

Miles	<500 ADTT	500-1,000 ADTT	1,001-3,000 ADTT	3,001-5,000 ADTT	>5,001 ADTT	Coal Haul	Total
Highway	3,945	3,234	2,570	113	21	439	10,322
Interstate	0	34	327	484	290	0	1,135
Total	3,945	3,268	2,897	597	311	439	11,457

TABLE 2 Pavement Serviceability Ratings

	Deteriorated			Fair			Good			Total
	0-9	1.0-1.4	1.5-1.9	2.0-2.4	2.5-2.9	3.0-3.4	3.5-3.9	4.0-4.5	4.5+	
Miles	16	31	434	1,243	2,546	3,064	2,349	1,385	389	11,457
Percent	—	—	4	11	22	27	21	12	3	100

Note: Dash = less than 1 percent.

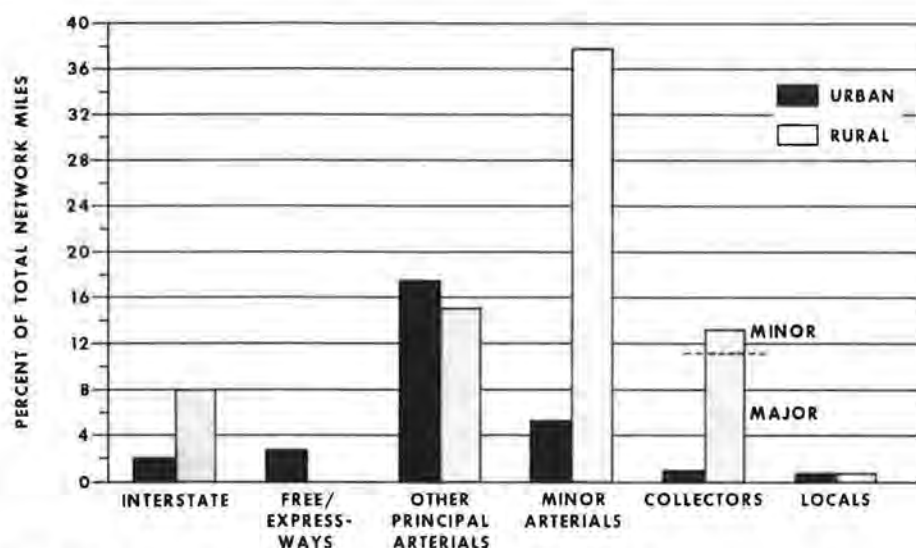


FIGURE 1 Priority Commercial Network mileage by functional class.

TABLE 3 Mileage by Federal-Aid Systems

System	Description	Mileage	Percent
Federal-aid interstate	Urban	225.3	
	Rural	905.1	
Total		1,130.4	9.9
Federal-aid primary			
Freeways and expressways	Urban	263.5	
Principal arterials	Urban	1,320.3	
Principal arterials	Rural	1,704.6	
Minor arterials	Rural	4,344.9	
Total		7,633.3	66.6
Federal-aid secondary			
Major collectors	Rural	1,357.7	
Total		1,357.7	11.8
Federal-aid urban			
Principal arterials		598.2	
Minor arterial		550.0	
Collectors		54.3	
Total		1,202.5	10.5
Non-federal-aid			
Local	Urban	7.4	
Minor collector	Rural	103.8	
Local	Rural	22.2	
Total		133.4	1.2

The constraints to commercial travel that were identified on the network included deficient bridges, high truck incident locations, and long steep grades.

Bridges

Analysis of all bridges on the 11,457-mile Priority Commercial Network shows that 1,095 of the bridges are currently deficient [sufficiency rating (SR) <80.0 and structurally deficient or functionally obsolete]. The estimated cost to repair or replace these bridges is \$1.2 billion. A further effort was made to identify the most critical needs. The deficient bridges were separated into six categories and compared with all bridge deficiencies statewide:

1. Category A--All bridges statewide with SR < 80.0,
2. Category B--Priority commercial bridges with SR < 80.0,

3. Category C--Priority commercial bridges with SR < 50.0,

4. Category D--Priority commercial bridges posted or closed or with SR < 25.0,

5. Category E--Priority commercial bridges with SR < 25.0,

6. Category F--Priority commercial bridges posted or closed, and

7. Category G--Priority commercial bridges posted or closed and with SR < 25.0.

Category D (posted and closed bridges, or bridges with sufficiency ratings less than 25.0) represents a population of deficient bridge structures that demand immediate attention for programming purposes.

Updated information obtained from Pennsylvania's Structure Inventory Records System including the number of bridges 20 feet and longer, the square footage of deck area, and cost to repair or replace these bridges is recorded by district for each of the six categories in Table 4.

Long Steep Grades

Of 93 long steep grades identified statewide before this study effort, 85 are located on the PCN. During the coordination phase the districts and planning commissions identified 38 additional grades that they considered problems for truck travel. The 38 grades identified needed to be evaluated using the methodology and criteria that resulted in the 93 initial grades, and progressive levels of improvements needed to be identified.

Of the initial 85 grades, 68 were found to be adequately signed; the signing of the remaining 17 grades is being upgraded. Ten PCN grades have been signed to the maximum extent and have been targeted for physical improvements (such as mandatory pull-off areas or truck-escape facilities). PennDOT has reviewed these grades and determined a progressive set of improvements to be considered by the districts in future betterment programs.

High Truck Incident Locations

Of the 278 incident locations identified on the network, 242 (87 percent) are on highways that carry

TABLE 4 Bridge Deficiencies on the Priority Commercial Network

DIST NUMBER	STATEWIDE NETWORK				PRIORITY COMMERCIAL NETWORK							
	A				B				C			
	S.R. < 80.0				S.R. < 60.0				S.R. < 50.0			
	#	SQUARE FT. DECK AREA	% DA	COST	#	SQUARE FT. DECK AREA	% DA	COST	#	SQUARE FT. DECK AREA	% DA	COST
1-0	774	2,269,550	9.28	191,767	171	1,137,420	8.95	56,660	92	604,802	9.60	46,007
2-0	459	1,112,222	4.55	168,148	72	538,008	4.23	52,930	39	212,058	3.37	46,408
3-0	840	1,618,328	6.62	328,602	118	685,445	5.39	165,198	81	487,344	7.74	155,355
4-0	386	1,241,567	5.08	84,904	45	488,395	3.84	17,321	10	147,039	2.33	10,279
5-0	463	2,100,091	8.59	106,666	114	1,364,040	10.73	47,870	32	343,178	5.45	31,784
6-0	600	4,071,610	16.65	301,491	108	2,596,428	20.43	144,515	46	1,603,410	25.46	80,805
8-0	819	1,965,526	8.04	77,495	92	634,097	4.99	9,553	33	264,614	4.20	7,723
9-0	391	1,030,231	4.21	77,823	37	362,254	2.85	7,979	10	71,570	1.14	3,831
10-0	632	1,834,688	7.50	236,140	116	1,037,986	8.16	86,565	27	172,615	2.74	42,910
11-0	400	5,314,845	21.73	631,731	112	2,695,639	21.21	360,901	64	1,965,316	31.20	307,352
12-0	646	1,896,007	7.75	275,702	110	1,171,686	9.22	212,673	32	426,353	6.77	40,952
TOTAL	6,410	4,454,665	100.00	2,480,469	1,095	12,711,396	100.00	1,162,125	466	6,298,299	100.00	773,406

DIST NUMBER	STATEWIDE NETWORK				PRIORITY COMMERCIAL NETWORK							
	A				D				E			
	S.R. < 80.0				POSTED & CLOSED OR S.R. < 25.0				S.R. < 80.0			
	#	SQUARE FT. DECK AREA	% DA	COST	#	SQUARE FT. DECK AREA	% DA	COST	#	SQUARE FT. DECK AREA	% DA	COST
1-0	774	2,269,550	9.28	191,767	31	277,824	8.45	34,856	30	260,674	8.57	33,388
2-0	459	1,112,222	4.55	168,148	13	36,316	1.10	9,633	11	32,245	1.06	8,155
3-0	840	1,618,328	6.62	328,602	28	247,266	7.52	98,166	24	193,469	6.36	70,660
4-0	386	1,241,567	5.08	84,904	1	32,220	.98	762	1	32,220	1.06	762
5-0	463	2,100,091	8.59	106,666	6	117,265	3.57	23,864	6	117,265	3.86	23,864
6-0	600	4,071,610	16.65	301,491	21	712,166	21.65	50,547	12	660,668	21.73	44,468
8-0	819	1,965,526	8.04	77,495	12	45,130	1.37	3,745	10	41,475	1.36	3,317
9-0	391	1,030,231	4.21	77,823	1	2,408	.07	1,025	1	2,408	.08	1,025
10-0	632	1,834,688	7.50	236,140	9	62,115	1.89	28,284	8	54,135	1.78	25,707
11-0	400	5,314,845	21.73	631,731	29	1,446,245	43.98	235,307	25	1,399,793	46.04	226,817
12-0	646	1,896,007	7.75	275,702	12	309,823	9.42	32,495	7	246,314	8.10	17,249
TOTAL	6,410	4,454,665	100.00	2,480,469	163	3,288,788	100.00	518,684	135	3,040,666	100.00	455,412

TABLE 4 (continued)

DIST NUMBER	STATEWIDE NETWORK				PRIORITY COMMERCIAL NETWORK							
	A				F				G			
	S.R. < 80.0				S.R. < 50.0				POSTED & CLOSED OR S.R. < 25.0			
	SQUARE FT.				SQUARE FT.				SQUARE FT.			
	#	DECK AREA	% DA	COST	#	DECK AREA	% DA	COST	#	DECK AREA	% DA	COST
1-0	774	2,269,550	9.28	191,767	5	67,325	4.72	17,328	4	50,175	4.25	15,860
2-0	459	1,112,222	4.55	168,148	6	11,696	.82	3,442	4	7,625	.65	1,964
3-0	840	1,618,328	6.62	328,602	13	168,813	11.81	77,690	9	115,017	9.74	50,184
4-0	386	1,241,567	5.08	84,904	1	32,220	2.25	762	1	32,220	2.73	762
5-0	463	2,100,091	8.59	106,666	5	114,260	8.00	23,864	5	114,260	9.67	23,864
6-0	600	4,071,610	16.65	301,491	17	181,533	12.70	32,697	8	130,034	11.01	26,618
8-0	819	1,965,526	8.04	77,495	10	28,917	2.02	3,340	8	25,263	2.14	2,912
9-0	391	1,030,231	4.21	77,823	1	2,408	.17	1,025	1	2,408	.20	1,205
10-0	632	1,834,688	7.50	236,140	7	59,795	4.18	27,792	6	51,815	4.39	25,215
11-0	400	5,314,845	21.73	631,731	18	647,765	45.33	150,948	14	601,312	50.92	142,458
12-0	646	1,896,007	7.75	275,702	11	114,271	8.00	29,123	6	50,762	4.30	13,877
TOTAL	6,410	4,454,665	100.00	2,480,469	94	1,429,003	100.00	368,011	66	1,180,891	100.00	304,739

1,000 or more trucks per day; of these 242, 74 (30 percent) are on Interstates.

Sixty-eight of the 278 incident locations have had 101 separate projects programmed. Of the 101 projects, 24 have been completed within the last 2 years, 38 are included in the 4-year priority program, 34 are included in either the fiscal year 1982-1983 or fiscal year 1983-1984 betterment programs, and 5 are programmed beyond the first 4 years. Examples of projects include resurfacing, shoulder, guardrail, median barrier construction, signalization, channelization, and turning lane construction. The remaining 210 locations (75 percent) identified during this study have not had projects identified or developed.

APPLICATIONS

In addition to the obvious development benefits, the PCN has served Pennsylvania in five additional key initiatives:

1. Bridge funding legislation,
2. Development of an agricultural access network pilot study and statewide implementation,
3. Delineation of a pavement management system,
4. Measuring agency performance, and
5. Setting department objectives.

Bridge Funding Legislation

An important initial use of the PCN resulted in state legislation to address the bridge problem in Pennsylvania. Legislators recognized the seriousness of the problem by passing a \$1.4 billion bridge bill

to rehabilitate or replace 979 structures during 6 years. This bill addresses various categories of bridges, and the PCN was instrumental both in the development of the bill and in the public and legislative acceptance of the bill as well as of the associated funding requirements.

Through this legislation, Pennsylvania has placed high priority on bridge repair. Bridges are the key stepping stones across Pennsylvania's entire 117,000-mile road, street, and highway network. The closing of a single bridge can make miles of good roadway useless until the bridge is replaced. In a similar manner, a weight restriction can force commercial traffic into lengthy and costly detours, sometimes on roads not designed to carry heavy traffic, contributing to the further deterioration of the highway network. This is especially true of restrictions on the PCN.

Pennsylvania has approximately 56,000 bridges; 21,600 are 20 feet or more in length. There are numerous deficiencies on this vast system of bridges: 7,500 bridges are structurally deficient or functionally obsolete; 3,800 bridges are restricted to 20 tons or less; and 200 are closed to all traffic (three-quarters of these are off the state system). The total repair bill for this backlog of deficiencies is estimated at \$3 billion.

Funding to meet this bridge crisis has been far from adequate. Under the Federal Surface Transportation Assistance Act of 1978, Pennsylvania received \$180 million in federal critical bridge funds over a 4-year period. Through the Surface Transportation Assistance Act of 1982, the need for additional bridge funding was recognized. Pennsylvania will receive approximately \$363 million over 4 years. However, this is only a meager beginning compared with the \$3 billion backlog of requirements.

In addressing these funding shortfalls, the PCN provided a new base of information on which to make decisions concerning the numerous bridge replacement and rehabilitation projects. The PCN was a method of assigning priorities to bridge deficiencies, placing importance on those problems most critical to commercial movements and the state's economic well-being.

In the analysis of PCN bridge deficiencies, the needs far exceeded the revenues anticipated under the Twelve Year Capital Improvement Program. Bridge deficiencies on the PCN were categorized (see Table 4). A balance had to be struck depending on funding assumptions and the level of deficiency to be addressed. The Pennsylvania Department of Transportation Program Management Committee decided to concentrate programming priorities on category D, those bridges posted or closed or having very low sufficiency ratings.

Figure 2 shows the September 1982 program status of the category D bridges. Of 148 bridges in this category, 101 (68 percent) were programmed. Of the 101 programmed bridges, 48 were included in the first 4 years. The remaining 47 structures that were not programmed had to be addressed.

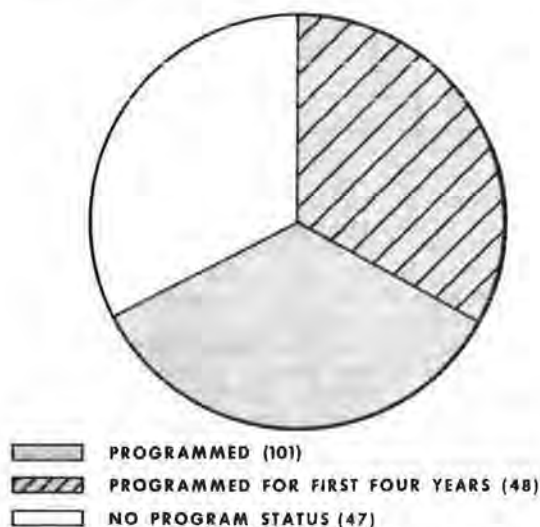


FIGURE 2 Priority Commercial Network programmed bridges. Bridges posted or closed, or with sufficiency ratings less than 25.0 (148 structures).

With other state and local priorities to consider, there still remained a serious lack of funding for these important commercial bridges. During late 1982 legislation was proposed to address the orphan bridge problem (orphan bridges carry highways over railroads and ownership of these bridges is in question). Planners worked with lawmakers to expand this legislation to provide a complete and comprehensive bridge program. With expanded funding, the inclusion of a greater number of PCN bridges was possible while still addressing other state priorities.

The entire 6-year program covers 979 structures and addresses the following categories of bridges.

Bridge	No.	Approximate Cost (\$)
Big PCN bridges	25	381 million
Other PCN bridges	211	347 million
Other priority state bridges	208	248 million
Local and agricultural bridges	329	178 million
Orphan bridges	206	196 million

The PCN bridges comprise only 24 percent of the bridges in this program but constitute 54 percent of the cost.

To fund this program, an additional fee per axle was imposed on all trucks using Pennsylvania highways. To gain legislative and public acceptance of the measure, the economic benefits to be derived from improvement of the PCN bridges were promoted. Based on the number of trucks detouring around the 104 restricted PCN bridges and an average operating cost per mile, the total annual cost to the trucking industry is \$228 million. Because the trucking industry must pay an additional \$69 million in annual taxes, the cost-benefit ratio to that industry is better than 3 to 1.

The PCN provides an overall picture of bridges inhibiting commercial traffic--the traffic most affected by bridge restrictions. The PCN provides the information to best select, at present and in the future, those projects that promise the greatest return to Pennsylvania's economy.

AGRICULTURAL ACCESS NETWORK PILOT STUDY

The Priority Commercial Network is serving as a basis for development of further information on highway and bridge problems affecting specific sections of the economy. Pennsylvania is currently developing an Agri-Access Network to complement the Priority Commercial Network. This is an extension of the PCN focused on information on rural roads and bridges essential to the agricultural industry and rural communities of the state.

Pennsylvania's agriculture is a vital industry. Cash receipts from marketing of farm products total \$3 billion annually. Agriculture and agribusiness form the largest single industry in the state. One out of five jobs, including those of supermarket clerks and trucking, processing, and production personnel, is in agribusiness. Farming operations also contribute heavily to the economy through their large purchases of petroleum products, machinery, equipment, and materials.

The transportation system has significant impacts on agriculture and rural communities. Obstructions, such as weight-restricted bridges, cause trip diversions of service vehicles that translate into higher operating costs. Continuing rail line abandonments also place an additional burden on rural roads and bridges.

This current project is a cooperative effort between officials of the transportation and agricultural sectors. Coordination with local government and farm organizations has been established and is continuing throughout the effort. Local input and assistance in identifying the network are essential elements of the project.

The planning effort is identifying a network of roadways most important to agriculture for the transport of commodities to market and supplies to the farm. This effort is identifying critical bridges in need of rehabilitation or replacement to improve the efficiency of movement of products to and from farm-related businesses as well as to increase the safety of travel by the rural population. Problems associated with the movement of emergency vehicles and loaded school buses are also being identified.

The already identified Priority Commercial Network is serving to focus the identification of these routes. Information gathered throughout this project has also supported the importance of the PCN. The entire PCN has proven to be essential to the state agribusiness economy. The majority of major operations serving the farm community such as processing

plants, fertilizer plants, and feed mills have been found to be located along or directly adjacent to the PCN.

The PCN is almost entirely comprised of higher functionally classed highways such as Interstates, expressways, and arterials. Whereas these highways link major urban centers and serve statewide and interstate travel, the agri-access highways are mainly collector routes linking agricultural areas and rural communities with the PCN.

Identification of these essential roadways that provide access between rural agricultural areas and the PCN is key to reducing transportation costs to the agricultural community and to obtaining the greatest benefits from the expenditure of limited roadway and bridge improvement funds.

DELINEATION OF A PAVEMENT MANAGEMENT SYSTEM

The Priority Commercial Network is presently being viewed as an integral part of the Department of Transportation's initial pavement management system.

Pennsylvania has more than 45,000 miles of state-owned roadways. To implement a working pavement management system, the roadways are being stratified with various levels of condition surveys proposed for each system. The Interstate system and the PCN are being used as the core system in pavement management. One hundred percent roadway distress surveys and rideability surveys will be performed on the system of highways in a uniform manner throughout each of the 11 engineering districts. Individual district surveys will be performed on the remaining roadways throughout Pennsylvania.

This stratification of systems will allow Pennsylvania to manage the roadways with a unique importance to commerce in a manner to best support economic development. The methodology also affords an opportunity for district offices to recognize the interregional importance of the PCN and to manage this roadway system accordingly. There is a need to manage a vast roadway system at various administrative levels, and a PCN allows for innovative decision making at both the network and project levels.

MEASURING AGENCY PERFORMANCE

The Priority Commercial Network provides a system of highways from which to measure how well the agency has addressed commercial and economic needs and interests. This was accomplished by evaluating all construction awards on and off this network.

Construction work initiated on the PCN from January 1, 1979, to October 1, 1982, is given in Table 5. More than \$1.3 billion was spent for 1,470 projects on this network. This compares with \$1.7 billion for all awards during the same period. Approximately two-thirds of the \$1.3 billion was spent on the replacement and rehabilitation of bridges and on the restoration of the commonwealth's highway and Interstate system. Three hundred ninety-six million dollars, or less than 30 percent, was spent on major construction and highway completion projects.

A comparison was made between awards on the PCN and all awards for the same period. This is illustrated in Figure 3. The PCN comprises nearly 25 percent of all state highways; however, nearly 80 percent of all improvement dollars were spent on this vital network.

SETTING DEPARTMENT OBJECTIVES

The Priority Commercial Network forms one of the

TABLE 5 Priority Commercial Network Construction Awards Versus All Awards

Program	PCN Awards (\$000)	All Awards (\$000)	PCN as Percentage of All Awards
Bridge replacement	99,862	139,326	71.7
Bridge rehabilitation	137,252	178,013	77.1
Major construction	1,216	3,013	40.4
Highway completion	395,524	395,524	100.0
Highway restoration	324,000	506,182	64.0
Interstate restoration	316,351	317,272 ^a	99.7
Local restoration	142	44,162	0.3
Energy conservation	6,383	9,224	69.2
TSM improvements	252	427	59.0
Safety	56,734	81,874	69.3
Total	1,337,716	1,675,017	79.9

^aInterstate funding used for Wood Street Bridge in Pittsburgh.

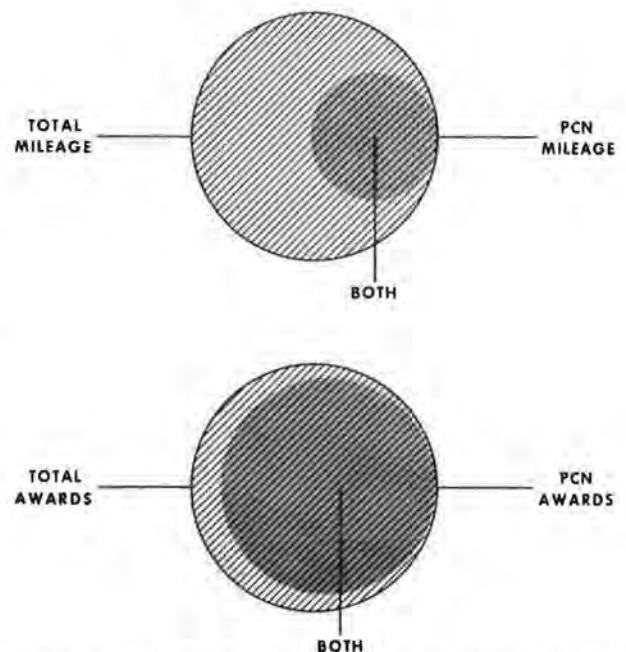


FIGURE 3 Comparison of total state highway mileage and PCN mileage with total state awards and PCN awards.

four major highway systems in Pennsylvania. In assessing the various requirements of these systems, the PCN is treated as a separate system for planning analysis. For example, in the determination of the backlog routine maintenance requirements of the various state highway systems, the requirements of the PCN were estimated. The dollars needed to overcome backlog maintenance needs related to pavement, shoulders, drainage, and appurtenances were estimated in terms of three levels of maintenance effort: dollars needed for that share of the system in good condition (i.e., requiring the least expenditures), dollars needed to repair mileage requiring a moderate level of maintenance effort, and dollars required for that share of the network requiring extensive maintenance efforts. An examination was also made of 1981-1982 winter services expenditures (snow and ice removal) to determine the distribution of costs for the network among the 11 engineering districts of PennDOT. Similarly, major construction and bridge improvement requirements for the PCN have been estimated.

In setting directions for the future efforts of

PennDOT, the number of roadway surface improvements to be accomplished over the next several years on the PCN is being examined. This includes the amount of restoration to be accomplished on the Interstate portion of the network. It also includes determining the magnitude of resurfacing, surface treatment, and seal coating to be accomplished on the non-Interstate portions. Resurfacing is applicable to those

sections with higher traffic volumes; surface treatment and seal coating are preventive maintenance techniques used to protect those parts of the network with lower volumes of traffic.

In conclusion, the Priority Commercial Network has been an essential tool in departmental decision making and is now becoming a recognized highway system in Pennsylvania.

Development of Pennsylvania's Agricultural Access Network

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ABSTRACT

A two-county pilot study was conducted to develop an Agricultural Access Network in Pennsylvania. The study identified the essential roadways that provide access to the rural agricultural areas for the transport of agricultural commodities to market and supplies to the farm. It further identified key transportation obstructions inhibiting movement of products and supplies. The pilot study used direct input from local representatives in the identification and refinement of the network. The process used in developing the network is described and the results of the study are summarized. The identification of the Agricultural Access Network provides important information concerning which projects will yield the greatest economic benefits to the agricultural and rural communities of Pennsylvania.

The efficient movement of agricultural products and farm inputs in Pennsylvania is highly dependent on rural roads and bridges. Restrictions on Pennsylvania's vast rural transportation system can result in substantial economic impacts on the agricultural and rural communities.

The Pennsylvania Department of Transportation (PennDOT) conducted a pilot study to develop an Agricultural Access (Agri-Access) Network. The purpose of the study was to provide information for responsible decision making and improve roadway service and access for rural communities and related agricultural commercial activities. This concept was an extension of another important initiative that involved the development of a Priority Commercial Network (PCN) composed of the major commercial routes in the state.

The objectives of the pilot study were to

- Identify the essential roadways that provide

access between rural agricultural areas and the PCN,

- Identify key transportation obstructions that inhibit movement of farm and forestry products to market and supplies to the farm, and
- Evaluate the effectiveness of the process used in the pilot study before applying the concept statewide.

In this paper the approach used in the development of the Agri-Access Network is described and the results of the analysis conducted in the two demonstration counties are summarized.

BACKGROUND

Agriculture is an extremely important segment of Pennsylvania's overall economy. There are 61,000 farms that market nearly \$3 billion worth of crops and livestock annually. There are also numerous related activities comprising the agribusiness industry that employ supermarket clerks and trucking, processing, and production personnel. One of five jobs in Pennsylvania is in agriculture or agribusiness. Farming operations also indirectly contribute to the economy through large purchases of petroleum products, machinery, equipment, materials, and services.

The transportation system has significant impacts on agriculture and rural communities. An adequate system of rural roads and bridges is important for farming and forestry operations and for overall rural economic development. The many agribusinesses and rural communities of Pennsylvania are geographically dispersed, have varying transportation requirements, and often have fewer transportation alternatives than do sectors located in the urban and suburban areas.

Providing an effective system of rural roads and bridges that meet the various needs of residents and businesses has become a difficult challenge for state and local governments. Many of Pennsylvania's rural roads and bridges were first constructed when farm and forestry products moved to nearby markets