Transportation Improvement Program for Northeastern Illinois

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ABSTRACT

This is the first of a two-part analysis of the effectiveness of programming federal highway funds in northeastern Illinois. The analysis is an attempt to determine if amendments to the transportation improvement program (TIP) and awards against the TIP alter the originally approved investment profile enough to diminish its consistency with regional priorities. The investment profile refers to the mix of projects and investments with respect to investment categories (e.g., maintenance, improvement, expansion), facility types (e.g., structure, roadway), fund sources, and geopolitical areas. The profile was compared three times: at approval time, after amendments, and after awards. Attempts are made to explain differences that were found, and implications for the region's programming policies are discussed.

The following paper is the first part of a two-part analysis of the effectiveness of programming federal highway funds in northeastern Illinois. The second part is to be accomplished in the fall of 1983, the end of the 1983 fiscal year.

The analysis resulted from questions raised about the effect of awards and amendments on the achievement of the goals and objectives implicit in the approved transportation improvement program (TIP). As stated in the TIP preface: "The project contained in the MYP and AE detail the next steps the region intends to take in achieving its transportation priorities." The process involved in developing this particular goal-oriented list of projects is extensive and involves "hundreds of meetings and thousands of person hours." And "when the Policy Committee, as the region's MPO, ultimately endorses the TIP...all projects within it have been screened on technical and fiscal bases, and have been reviewed to ensure their consistency with regional priorities (1, p. v). In addition, analyses, to indicate the extent to which the investment priorities are being addressed, are performed on the originally approved TIP. It is therefore desirable to determine if (a) the amendments and awards in any given year alter the originally approved investment profile so that its consistency with regional priorities is diminished, and (b) the investment profile from year to year is synergistically maintaining progress toward the region's goals and objectives. The second question will require a comparison of the impacts of consecutive TIPs. The first, the subject of this paper, requires an examination of changes that occur during a given year.

INTRODUCTION

After approval of the TIP, and within any 1 year, there are two ways that the final mix of projects actually implemented can be altered: (a) amendments to the program via the work program committee (WPC) or the policy committee (PC) and (b) awarding of limited portions of the approved program. Trends in these activities should maintain consistency with goals assumed by the WPC and PC at TIP approval time. In an attempt to determine what trends, if any, exist in the changes that occur throughout the year the TIP investment profile is examined at approval time, after amendments, and after awards. Profile means the mix of projects and investments viewed in terms of investment categories, facility types, fund sources, and regional councils.

IMPACT OF AWARDS ON TIP

The FY 82 FHWA awards include 266 projects and $262.3 million dollars. This accounts for 70 percent of the $377.5 million programmed in the amended FY 82 FHWA A list. Award rates for previous years have also been approximately 70 percent.

The major emphasis of the awarded program is maintenance and improvement with 86.7 percent ($227.3 million) awarded in these categories (Table 1). Almost half the awarded investment was for roadway projects and almost one-third was used for work on structures (Table 2).

The major funding sources of awarded projects were Interstate Transfer (nearly 60.0 percent) and Federal Aid Urban (29.7 percent) (Table 3). Forty-nine percent of the awards were for projects in Chicago. In addition to Chicago, regional councils with a high proportion of the total awards include South (9.3 percent), Northwest (6.6 percent), and Southwest (6.5 percent) (Table 4).

The foregoing provides a summary of the awarded program, and it also raises a question as to how this awarded program changes the emphasis of the policy committee's approved program. To determine this, a profile of the final amended annual element was compared with a profile of the awarded program. The profile includes four variables: investment category, facility, fund source, and regional council. Overall, these comparisons showed that the awards did not substantially change the makeup of the final amended TIP. There are, however, slight variations.

The most notable shift seen in investment categories (Figure 1) is away from expansion, addition, safety, and other investments to maintenance and improvement investments. According to the data in Table 1, maintenance and improvement categories together made up 81.7 percent of the amended program and 86.7 percent of the awarded program.

The data in Table 2 indicate that structure investments were increased from 17.1 percent of the amended program to 23.8 percent of the awarded program. Roadway investments also increased as a proportion of the total program. These shifts are shown in Figure 2.

The awards process had its most dramatic impact on the mix of fund sources. A major shift from Interstate Transfer Transit (ITT) to Federal Aid Urban (FAU) is shown in Figure 3. Table 3 indicates that

TABLE 1 Changes in Investment Category

Investment Category	Original		Amended		Awarded	
	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total
Signalization and intersection	39,659	10.9	32,253	8.6	25,190	9.6
Widen and W/RS	37,462	10.3	37,051	9.8	19,852	7.6
Reconstruct, etc.	40,766	11.2	60,023	15.9	55,198	21.0
Other improvements	63,327	17.4	71,820	19.0	41,187	15.7
Total improvements	181,214	49.9	201,147	53.3	141,427	53.9
Resurface	60,258	16.6	53,341	14.1	44,726	17.0
Structure rehabilitation	18,810	5.2	15,098	4.0	11,686	4.5
Other maintenance	25,313	7.0	39,447	10.4	29,604	11.3
Total maintenance	104,381	28.7	107,886	28.6	86,016	32.8
Add lanes	19,188	5.3	14,345	3.8	10,179	3.9
Other expansions	22,944	6.3	25,611	6.8	8,021	3.1
Total expansion	42,132	11.6	39,956	10.6	18,200	6.9
Addition	14,456	4.0	9,654	2.6	9,075	3.5
Safety	7,807	2.1	4,501	1.2	2,829	1.1
Other	13,514	3.7	14,389	3.8	4,786	1.8
Total	363,504		377,533		262,333	

TABLE 2 Changes in Facility Type

Fund Source	Original		Amended		Awarded	
	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total
Roadway	173,255	47.7	168,819	44.7	126,829	48.3
Intersection and signalization	43,943	12.1	36,150	9.6	27,848	10.6
Structure	47,485	13.1	64,625	17.1	62,472	23.8
Railroad crossing	4,584	1.3	7,559	2.0	1,274	0.5
Miscellaneous[a]	86,161	23.7	88,526	23.4	38,487	14.7
Other[b]	8,076	2.2	11,854	3.1	5,423	2.1
Total	363,504		377,533		262,333	

[a]Includes non-facility-specific projects like regionwide engineering.
[b]Includes shoulders, weigh stations, sidewalks, and so forth.

TABLE 3 Changes in Fund Source

Facility Type	Original		Amended		Awarded	
	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total
ITH	208,819	57.4	208,250	55.2	151,466	57.7
FAU	72,544	20.0	86,036	22.8	78,084	29.8
IDOT	42,788	11.8	44,278	11.7	26,864	10.2
ITT	39,353	10.8	38,969	10.3	5,919	2.2
Total	363,504		377,533		262,333	

TABLE 4 Changes in Regional Council Investments

Regional Council	Original		Amended		Awarded	
	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total	Dollars (000s)	Percentage of Total
Chicago	169,517	46.6	170,883	45.3	128,629	49.0
North Shore	11,765	3.2	11,974	3.2	10,740	4.1
Northwest	16,442	4.5	19,472	5.2	17,218	6.6
North Central	7,261	2.0	9,118	2.4	9,588	3.7
Central	17,816	4.9	17,435	4.6	6,050	2.3
Southwest	32,374	8.9	36,924	9.8	17,202	6.5
South	29,706	8.2	28,762	7.6	24,313	9.3
Lake	16,920	4.7	17,348	4.6	13,456	5.1
McHenry	3,575	1.0	3,910	1.0	2,102	0.8
Kane	10,410	2.9	10,948	2.9	4,740	1.8
DuPage	29,210	8.0	27,063	7.2	15,165	5.8
Will	10,791	3.0	9,212	2.4	5,106	1.9
Regionwide	7,717	2.1	14,484	3.8	8,024	3.1
Total	363,504		377,533		262,333	

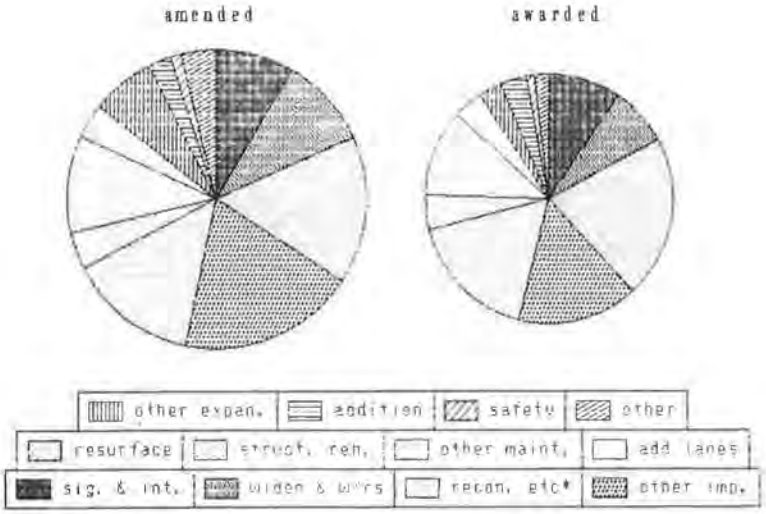

FIGURE 1 Investment categories: amended and awarded.

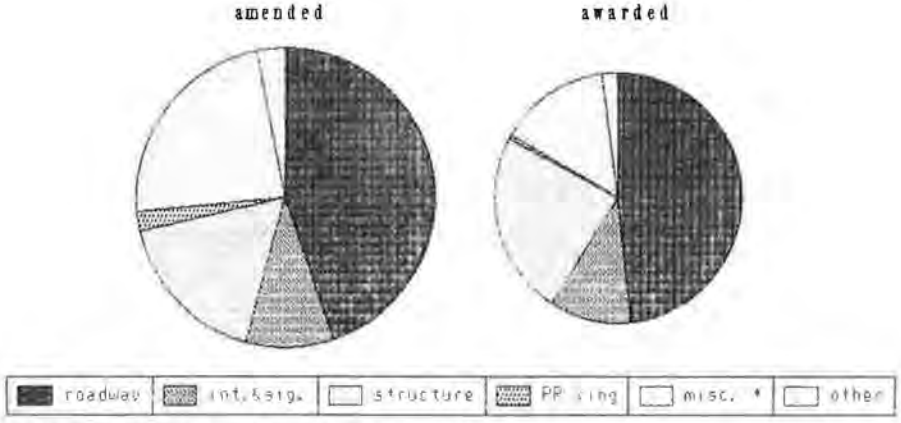

FIGURE 2 Facility types: amended and awarded.

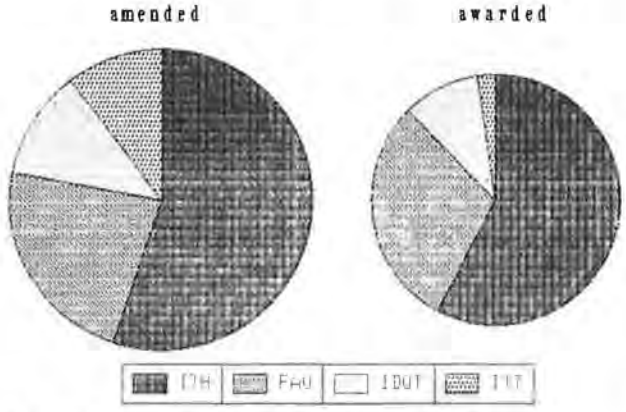

FIGURE 3 Fund sources: amended and awarded.

15.2 percent of the ITT funds were awarded whereas 72.7 percent of the FAU funds were awarded. Figure 4 shows that the high award rate for Chicago (Table 4) has a relatively small impact on the remaining councils, although some minor shifts occur.

DISPOSITION OF UNAWARDED PROJECTS

In the previous section it was shown that the awards process slightly changes the profile of the program. However, awards are historically only 70 percent of the amended program. This raises a question as to what happens to the extra $110 million that is programmed in the annual element but unawarded. Specifically, are there any patterns to be found in the investments that are not awarded?

Figure 5 traces the unawarded investments. Only 81 percent ($88.9 million) of the unawarded FY 82 annual element was in the original unamended version of the FY 82 annual element. Eleven percent ($12.3 million) of the FY 82 unawarded investment was amended into the final annual element from the multiyear element and 8 percent ($8.9 million) was added to the annual element through amendments as new projects. Presumably these projects were added to the annual element in anticipation of their being awarded, but $10.9 million of them were dropped. A total $66.6 million in unawarded projects were dropped and therefore not carried over into FY 83.

In addition to the $110.1 million in unawarded projects in the final amended FY 82 annual element, $90.1 million ($179.0 minus $88.9 million) of the original unamended FY 82 annual element projects were unawarded. These investments were either moved to the multiyear element (68.7 million) or deleted ($21.4 million) via amendments. Therefore, $200.2 million ($110.1 + $90.1 million) in projects were in the FY 82 annual element sometime during the programming year but were unawarded.

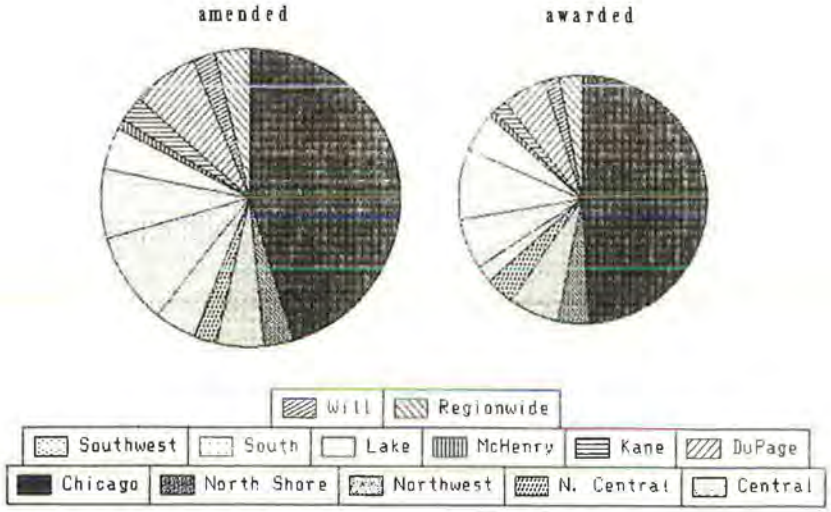

FIGURE 4 Regional councils: amended and awarded.

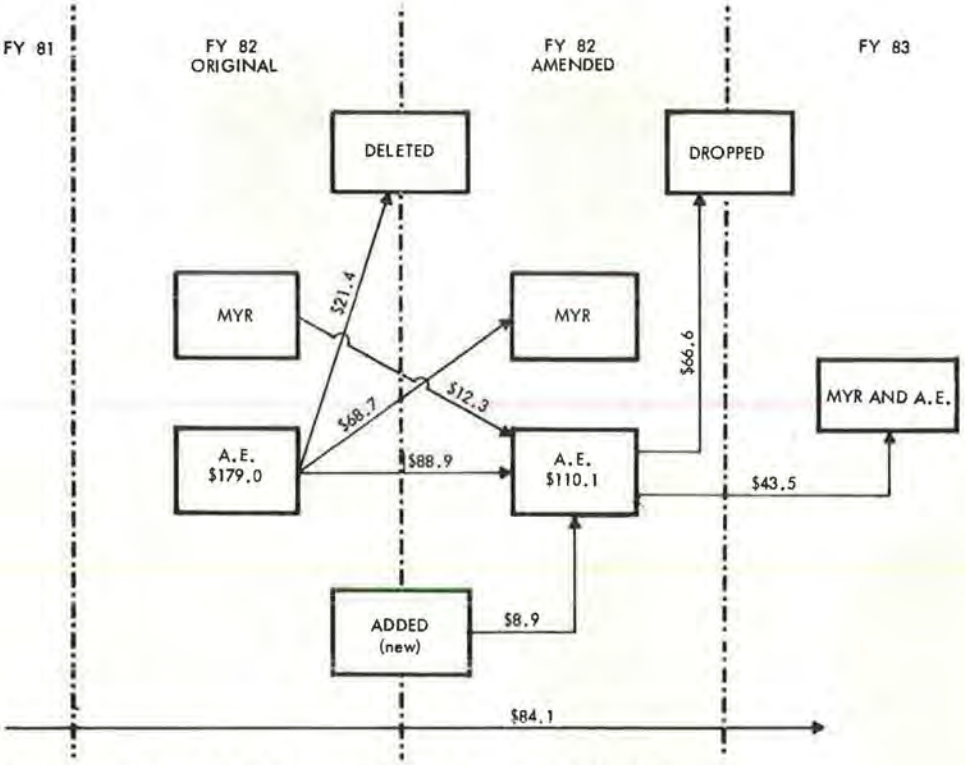

FIGURE 5 Unawarded FY 82 annual element investments (000,000s).

The $200.2 million is a substantial investment--three-quarters the size of the total awarded program. These unawarded projects apparently make up a set of marginal projects that float in and out of the annual element and between programming years. Only $43.5 million was carried over into FY 83. Eighty-four million of the unawarded FY 82 investment was originally programmed in the FY 81 annual element or multiyear element and carried over to the FY 82-86 program, unawarded, and either dropped or carried over into FY 83-87.

The maintenance of this large unawarded investment (in the current as well as the previous and pursuant programs) allows (a) a flexible programming strategy that takes best advantage of a changing funding environment, (b) changes in the program profile and size without the obvious notice or intent of the WPC as a whole, and (c) the awards decisions of the funding entities to have a major impact on the profile of the region's annual element.

IMPACT OF AMENDMENTS

The amendment process is designed to allow implementors to change the TIP to reflect changes in availability of funds and project readiness. This flexible amendments procedure recognizes the rapidly

changing political and economic forces affecting funding and project preparation and attempts to take advantage of this dynamic environment for the region's transportation interests.

However, without monitoring, the amendment process could allow for gradual yet radical changes in the TIP investment profile. The discussion in the first section of this paper indicated that the awarded program changes the profile of the final amended program to a slight degree. That part of the analysis was based on the difference between the final amended program and the awarded program. However, the magnitude of amendments may change the content of the TIP significantly before awards. The discussion in the second section indicated that the unawarded investments that are amended out of the annual element are substantial. Amendments in FY 82 added 60 projects to the annual element and deleted 23 projects for a net increase of 37 projects and $26.7 million. That is an increase (attributable to projects moved in or out of the annual element) in dollars of 7.3 percent and in projects of 10.2 percent. Amendments to costs that did not move a project in or out of the program account for a decrease of $12.7 million in the annual element. Altogether the dollar amount of the amended annual element is 3.8 percent larger than that of the originally approved annual element.

To determine if the content was changed significantly via the numerous amendments, the annual element investment in the original (unamended, approved) and final (amended) versions was compared by investment category, facility, fund source, and regional council. The data in Table 1 show that amendments increased improvements slightly from 49.9 percent of the original program to 53.3 percent of the amended program (Figure 6). Addition and safety investments were decreased. Some shifts for facility types are seen in Table 2. Shown in Figure 7 are increases in structure and railroad crossing investments and decreases in roadways, intersections, and signals. Changes in fund sources between the original and final programs appear to be nonexistent in Figure 8. The data in Table 3 indicate a slight increase in FAU funds and a comparable decrease in ITH funds as proportions of the total programs. Figure 9 and Table 4 show slight changes in the profile of the TIP with respect to regional councils.

COMBINED IMPACTS

The discussion in the first section indicated that

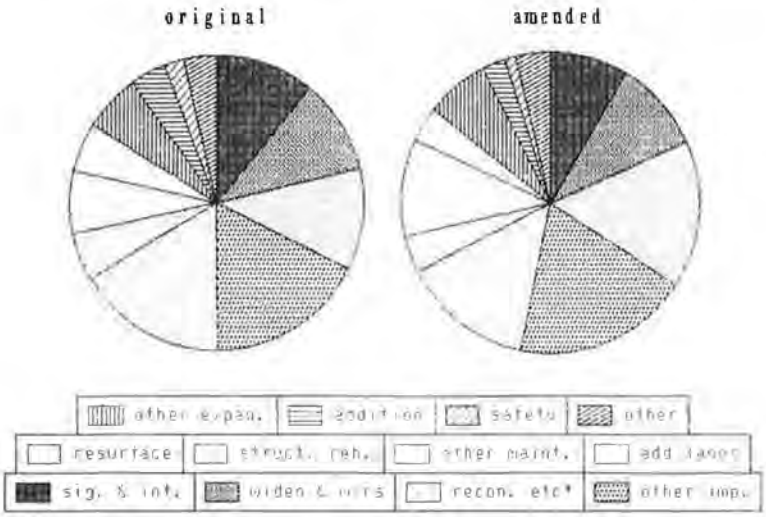

FIGURE 6 Investment categories: original and amended.

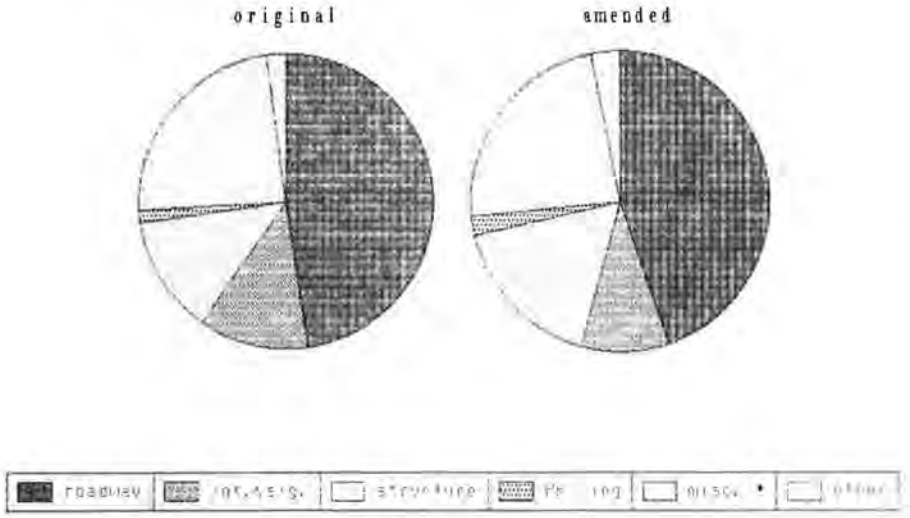

FIGURE 7 Facility types: original and amended.

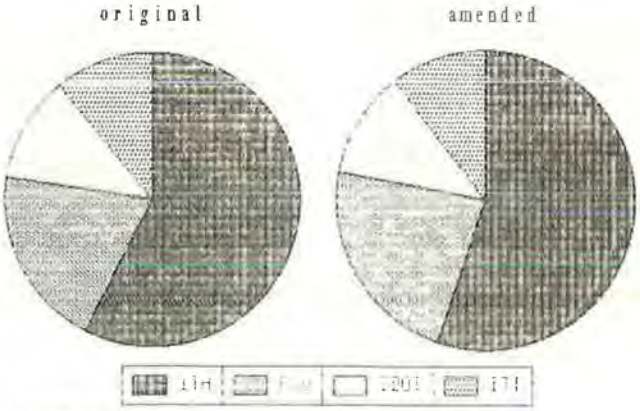

FIGURE 8 Fund sources: original and amended.

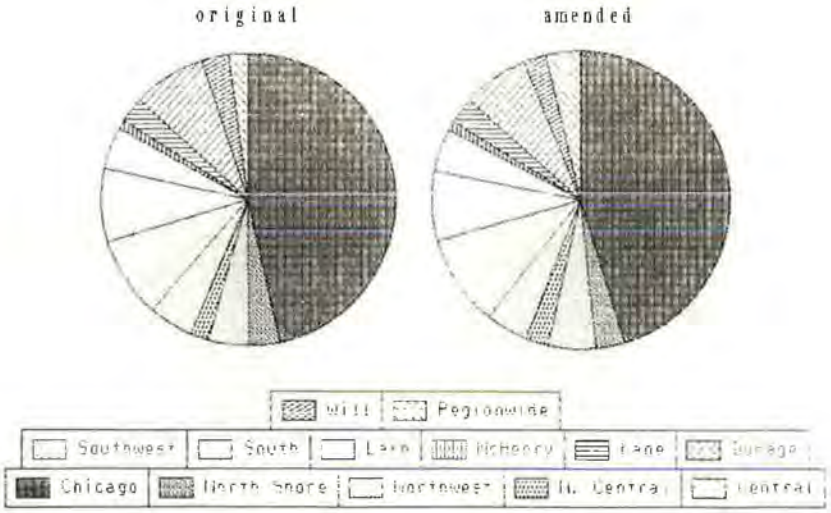

FIGURE 9 Regional councils: original and amended.

the 70 percent award rate was slightly changing the profile of the amended program. Subsequent sections indicated that amendments are substantial and, in a few cases, causing notable changes in program profile. Figure 10 shows the original and final programmed investments by year and award status. It illustrates that only 62.3 percent of the awarded investment was in the original annual element. Thirteen percent was added through amendments as new projects, and 25 percent was brought forward from the multiyear element. In the following paragraphs the combined impacts of these amendments and awards on the program profile are examined.

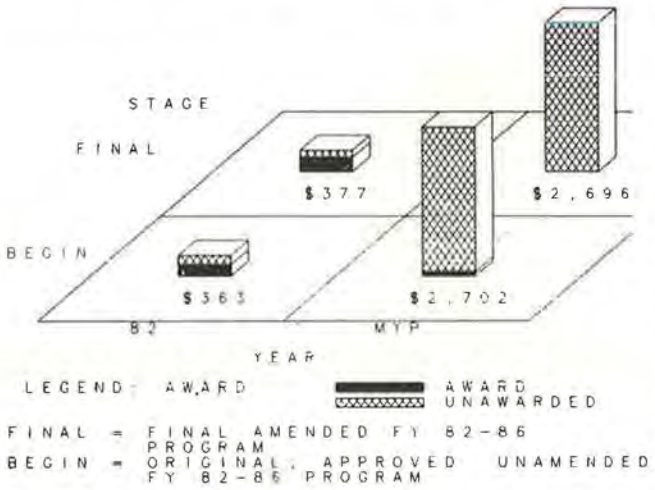

FIGURE 10 Original versus final program by year and award status (000,000s).

The combined impacts show a notable increase in maintenance and improvement investments at the expense of all other investment categories (Figure 11). Within improvements, reconstruction investments increased considerably from 11.2 percent of the original program to 21.0 percent of the awarded program (Table 1). Other maintenance also increased substantially.

Another major shift occurs within facility type (Figure 12). Investments in miscellaneous facilities made up 23.7 percent of the original program but only 14.7 percent of the awarded program. Investment in structures increased from 13.1 percent to 23.8 percent (Table 2).

The combined impacts also show significant changes in fund sources. Figure 13 shows that the original program was 10.8 percent ITT and 20.0 percent FAU, whereas the awarded program was 2.2 percent ITT and 29.8 percent FAU (Table 3).

The most notable change in the regional councils (Figure 14) is an increase in the investment in Chicago from 46.6 percent of the original program to

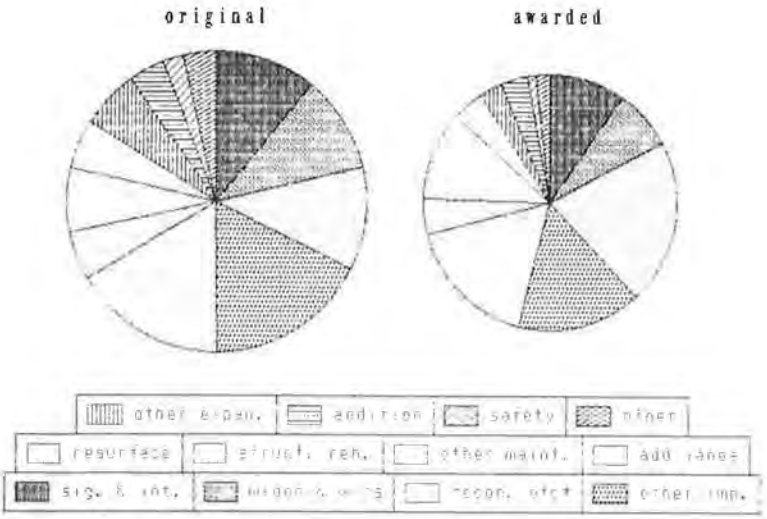

FIGURE 11 Investment categories: original and awarded.

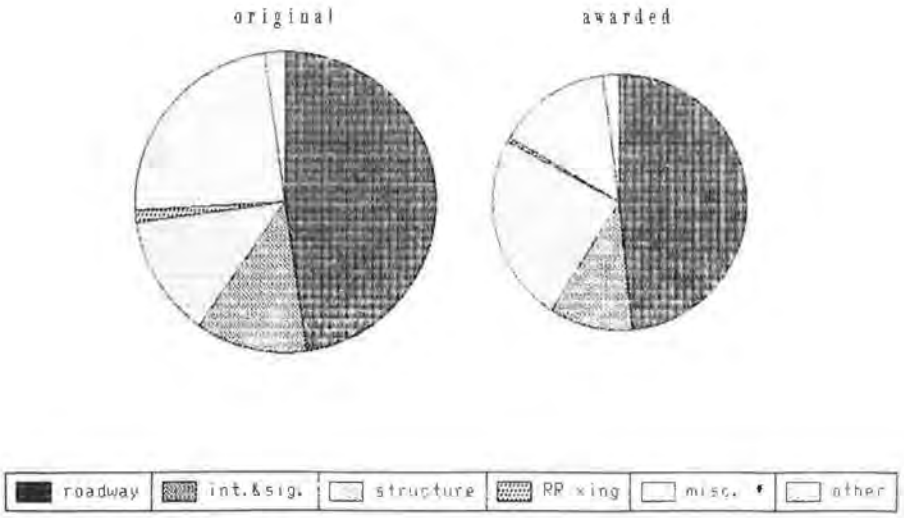

FIGURE 12 Facility types: original and awarded.

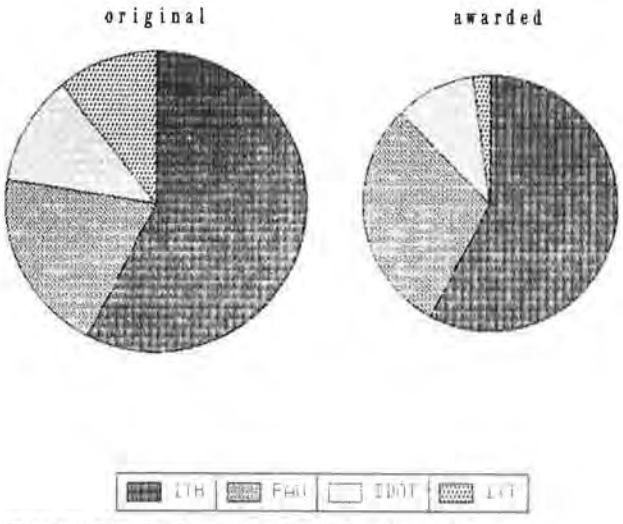

FIGURE 13 Fund sources: original and awarded.

49.0 percent of the awarded program. Because there are so many councils, other shifts are not obvious in Figure 14; however, the data in Table 4 indicate that significant changes did occur.

All of the preceding has been based on shifts of investment dollars among categories and types of investments--not on numbers of projects. This is because the amount programmed is a better indicator of program emphasis than are numbers of projects. However, changes in costs of projects caused by inflation, deflation, or improved estimates could change the magnitude of investments in categories or types of investments without really changing the original profile or intent of the program.

Therefore, the changes in costs caused by both amendments and awards were examined. The differences in awarded costs vary considerably, both above and below the programmed cost. Twenty-six projects were awarded at costs more than 50 percent higher or lower than the programmed costs. However, average costs were raised slightly by amendments from $934 thousand to $953 thousand. The awards process raised the average cost of projects from $953 thousand to $993 thousand.

Program	Average Cost ($000s)	Maximum Cost ($000s)	Minimum Cost ($000s)
Original annual element	934.5	15,175	4
Final amended annual element	953.4	40,000	0
Awarded	933.7	45,780	0

In spite of the implications of this table, more projects are awarded at costs lower than their programmed costs than are not. In addition, the percentage difference between awarded and programmed costs is approximately the same for both high-cost and low-cost projects. However, the fewer higher cost projects are more often awarded at costs higher than those for which they were programmed, and lower cost projects were more likely to be awarded at costs lower than those for which they were programmed. This explains the higher average awarded cost. These cost differentials effected by the awards may parallel the shifts in investment profiles seen in previous sections. It is likely that major differences in awarded and programmed costs reflect a change in project scope or description and would therefore be reflected in the previous pages.

CONCLUSIONS

In general, the unawarded and amended portions of the TIP were of a magnitude great enough to create significant potential for changing the intent of the original program. However, except in a few cases, the amendments and awards did not appear to significantly alter the profile of the program. Some important observations can be made about the shifts seen in the TIP profile caused by amendments and awards.

The most obvious of these shifts was toward increasing investments in structure improvements. The major cause of these shifts is the advancement of a new structure (Lake Shore Drive at the Chicago River) from the annual element "B" list to the annual element "A" list, and its subsequent award. Although it can be said that this is insignificant because it is only one project, it still represents a large portion of the awarded program ($40 million) and greatly limits capital funds available for other investments.

A shift, primarily due to awards, was seen in fund sources. Local programmers have less power over the availability of the funds by source than over the actual use of these funds. However, major differences exist in the restrictions and uses of the various funds such that major shifts in the kinds of funds that make up the total program could dramatically affect other aspects of the profile of the program. That some shifts are occurring in fund sources without major shifts in other aspects (such as investment categories, regional councils, and work types) could indicate that programmers have in most cases carefully planned and adjusted the program to most effectively use available funds regardless of their source. The flexible amendments procedure helps make this possible. For example, addition projects were decreased by about 34 percent through amendments, but almost all of the remaining addition projects were subsequently awarded. It is probable that programmers correctly anticipated which of the addition projects were likely to be awarded and diverted the remaining funds to other eligible projects.

In addition to the $262 million awarded program, $200 million was programmed in the FY 82 annual ele-

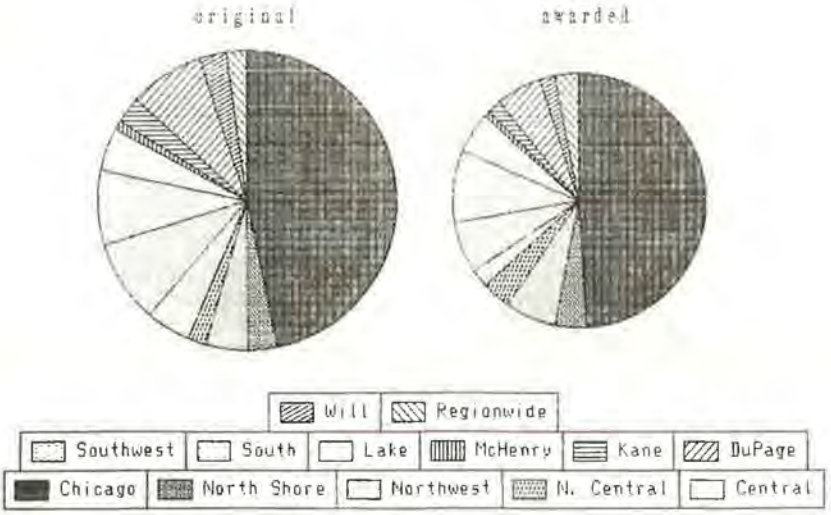

FIGURE 14 Regional councils: original and awarded.

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

THOMAS E. TENEYCK, DENNIS E. LEBO and LINDA M. PROCTOR

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)