

THE HIGHWAY CONSTRUCTION PROGRAM

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A clear statement of the major principles which should guide public works policies is written into the Economic Report of the President to the Congress January 8, 1947. Never before has there been expressed in concise terms by such high official authority a doctrine so sound it reflects with singular authenticity the National experience in this field. Here is a charter that has long been needed to define the role of public works in the Nation's economy, and to recognize both the inherent limitations and merits of such undertakings. Only when there is at least a reasonably common understanding of sound public works policies among the public generally, the responsible public officials and the construction industry as a whole, can their united strength be effective, first, in the formulation of public works programs, and second, in their actual accomplishment with mutual benefits. The validity of some of the principles expressed is well illustrated by their application to the highway improvement program.

Deferrable and non-deferrable public works.

"Since many public works projects are not related to the problems of business operations nor to the daily needs of consumers, they are subject to adjustment in their time of commencement and their rate of progress. This had led, particularly in recent years, to an over emphasis

upon the prospects of stabilizing our whole economy through the bold use of public works."⁽¹⁾ Here is the important separation of public works into two types, first, those which are necessary for business operations and consumers' needs, that is, the living needs of the whole public as individuals, and second, those works which are not essential to these needs. In a single class of public works, such as highways, there can be a certain degree of classification into deferrable and non-deferrable groups, but the highway plant has now reached such dimensions that the normal replacements of roadways that have deteriorated beyond maintenance and that have become obsolete with age and the increased traffic demands, total a large annual non-deferrable program. To these normal requirements we have added the lag of replacements accumulated during the war. At the close of 1946, the inspection reports of Federal aid projects carried 27,218 miles, which is 14.5 percent of a total of 187,557 miles, in the necessary replacement class. If this same ratio holds on other highways maintained by State highway departments, of the 547,285 miles there would be 65,000 miles in need of reconstruction. How serious is this situation is indicated by the growth of maintenance costs to approximately \$750 million this year. This illustrates very well the fact that if replacement is neglected, maintenance costs increase, and we substitute the less efficient maintenance dollar for the construction dollar.

On the showing that the desirable safe capacity of a 2-lane road

(1) Public Works - Economic Report of the President, 1947

is 3,000 vehicles per day, on an annual average, there are in the neighborhood now of 14,000 miles which need to be stepped up to the 4-lane design, and these inadequate highways are on the main-traveled routes of the States.

These authentic needs must be met.

The Program for the Immediate Future.

Quoting again from the report, "Instead of regarding public works as the first and foremost device to restore our whole economy when it sags, we should attempt to stabilize public-works construction according to our long-term needs. Increasing regularization of public-works expenditures at all levels of governmental activity over a long period will offer an assurance of a demand for capital, of a market for materials and equipment, and of a field for employment which will assist in stabilizing that segment of the business world. This approach to public works will have the further advantage of appraising their size and character in terms of our total National needs."⁽¹⁾ This principle will find eager acceptance in the highway field on the part of public officials and the construction industry alike. It might well be added that our highway plant in operation creates the market for many of our largest business concerns such as the petroleum, the automotive and the rubber industries. The goal of a stabilized, long-term highway development program which would carry with it a stabilized highway construction industry is so desirable that it must command our every effort. Under

present conditions it is difficult, perhaps impossible, of attainment. A united effort to this end can accomplish much, but many important changes must be effected. A review of the 1946 program indicates some of the problems, as follows:

(1) A rising price index - Federal aid projects

The price index, based upon the composite mile of road, is

	for 1st quarter 1946,	119.3
" 2nd	" "	117.0
" 3rd	" "	122.1
" 4th	" "	133.3

These indices compare with the 1940 index of 71.6. They reflect costs of 166, 163, 170 and 186 percent above 1940.

It is obvious that the construction program will not be stabilized on a rising price market.

(2) The apparent lack of contractors.

During the period 1935-1946, inclusive, we have had a total of 5,614 contractors performing Federal-aid highway construction.

During the period 1940-1946, inclusive, there were 3,057 contractors performing Federal-aid highway construction.

This leaves a balance of 2,557 contractors who performed Federal-aid highway construction during the period 1935-1939, inclusive, who have had no Federal-aid highway work since 1939. This shows a mortality of approximately 45 percent. Many of these contractors are returning to the

highway field, and it is assumed that a good many more will do so. It is believed that the rather high percentage of mortality is due to the fact that during the depression years a large number of small contractors entered the highway field, particularly in the middle west, and when conditions became more normal, returned to their former employment.

It might be interesting to note that during 1946 we have added approximately 350 new contractors who have not heretofore performed Federal-aid highway construction.

The figures for 1946 are not entirely complete, as many contracts have not yet been received from the field, but as the season advanced the decreasing competitive status, as indicated by the falling off of the number of bids received at lettings, became a matter of much concern to the highway officials. There were other causes, but the decrease in the number of contractors willing to undertake the work offered was a definite fact.

(3) The record of contracts awarded for the calendar year 1946.

	<u>Number</u>	<u>Amount</u>	<u>Percentage</u>
Contract awards, Federal aid	3,642	\$504,901,758	76.6
Bid rejections by States	883	125,826,803	19.1
Bid rejections by Public Roads	93	15,515,389	2.3
Awards pending 12-31-46	<u>171</u>	<u>13,109,482</u>	<u>2.0</u>
Totals	4,789	\$659,353,432	100.0

As of December 1st, 3,300 projects were under construction, and of those which have been under way for at least some weeks, about 25 percent are lagging.

The reasons for unsatisfactory progress as reported by the field engineers are as follows:

	<u>No. of Projects</u>	<u>Percentage</u>
1. Labor	66	10
2. Management	134	19
3. Equipment and Materials	215	31
4. Combination of above reasons	169	24
5. Weather	94	14
6. Miscellaneous	<u>12</u>	<u>2</u>
Totals	690	100

The 1947 construction year will start with a considerable backlog of uncompleted projects.

(4) The 1947 outlook for materials.

Since the cause producing the largest percentage of delay on the going program is the lack or slow delivery of equipment and materials, these become very important in gaging the probable program for 1947. As yet we are unable to forecast the equipment or repair parts supply. The availability of materials should improve in future months.

The States have been circularized and they have estimated their requirements for structural steel for the calendar year 1947 to be approximately 400,000 tons. In our discussions with the representatives of the steel industry they have indicated that this amount will be made available.

Based on the total estimated construction cost for 1947, the estimated cement requirements will be 16,646,000 barrels. This figure is obtained by using a cement factor derived from quantities and cost of cement used in previous years. The Portland Cement Association has advised that during 1946 between 180,000,000 and 185,000,000 barrels of cement were produced (figures not final). They estimate that 1947 production will amount to approximately 200,000,000 barrels. At the present time cement is scarce in certain sections of the country, particularly in the southwest, and it is estimated that it will continue so for the first quarter of 1947. Thereafter it appears that sufficient cement should be available to take care of the States' requirements.

Based on the above mentioned construction cost, the estimated requirements for lumber for 1947 will amount to approximately 165,000 MBM. The best information available, principally from trade magazines, indicates that while lumber is still somewhat scarce, production is gradually being

increased and that later on in the year there should be sufficient lumber available to take care of the requirements.

We have been assured that ample bituminous materials will be available throughout the United States.

(5) Unit prices for contract items.

There is attached a comparison between 1940 and 1946 prices for the items appearing in Federal aid construction contracts. While there is an increase in all items, there appear many inconsistencies in the very wide variations among the items for which little logical reason would seem to exist and some contradiction. For example, while the increase in common excavation is 60 percent, the increase in borrow is 115 percent. This surely appears contrary to our belief that the efficiency of hauling equipment has been materially increased. The increase in the item of common dry excavation is 110 percent, although excavation equipment has certainly been improved and is more generally used in replacement of higher cost methods. Bituminous surface treatment shows the lowest increase for any item of only 15 percent. Structural concrete shows an increase of 94 percent for superstructures, and again the apparent inconsistency of 101 percent increase in the same item for substructures, exclusive of foundation and footings. There may be some reasonable justification for some of these variations, but they are certainly not self-revealing.

During the year there has been some irritation expressed by State highway departments and by contractors as to the policy followed by Public Roads in requesting an analysis of costs to support bid prices. A careful study of the actual weighted average bid prices, with their wide variation in percentages of increase should be convincing that cost analyses are required as a procedure in the prudent management of public funds.

(6) Compensation rates for construction.

Supervision and labor.

The comparison between 1938 and 1946 supervisory and labor rates is shown as follows:

Classification	: Employment		Compensation		Average Rate	
	: % Total		% Total		per	
	: Man-Hours		Pay Roll		Man-Hour	
	:1938	: 1946	1938	: 1946	1938	: 1946
Supervisory, etc.	18.9	14.9	19.0	18.1	\$0.72	\$1.39
Skilled	10.9	24.3	11.0	32.3	1.01	1.51
Intermediate	19.9	24.5	20.0	24.7	0.63	1.14
Unskilled	50.3	36.3	50.0	24.9	0.39	0.78
Totals or Averages	100.0	100.0	100.0	100.0	\$0.57	\$1.14

Part of Total Construction Cost	:	1935	:	1946
formed by Pay roll in	:	%	:	%
Highway Construction Work	:	24.4	:	31.3
	:		:	

Again, with reference to the Economic Report: -

"This policy by no means forestalls the expansion of public works as a sustaining factor if recessions or depressions should unfortunately develop despite our best efforts to avoid them. The very procedure necessary for long-term regularized expenditure will pave the way for more effective emergency use than in the past."

The highway construction industry is deeply affected by the lack of stabilization of the public works program on a long-term basis. It is important that highway officials, contractors and all of the construction industry take thought for any contingency that might require an expansion

of public works. We do not wish again to be unprepared to the extent that work relief expenditures shall go into unplanned and unprofitable undertakings.

Great strides have been made in planning the road program ahead. There is one essential element, however, that has constantly imposed great delays upon the actual undertaking of well planned improvements. This is land acquisition.

Too often in the past, the character of road improvements undertaken has been governed by the limitations of shortsighted land acquisition measures. When the acquirement of land is postponed, as usually it has been, until the very moment of need for construction purposes, it is often discovered that the land actually wanted cannot be obtained without long delay. Time pressing, plans are altered to require less, or more available land, and in the end it is found that too much has been paid for inadequate takings.

The causes of these conditions are mainly two: One is the failure to plan and provide funds for land purchases sufficiently in advance of the occasion for road construction. The other involves the cumbersome and time-consuming land acquisition processes prescribed by the laws of many States. If the rebuilding of Federal-aid routes, and the construction of the National system of interstate highways and other expressway facilities are to be unwarped by right-of-way compromises, both of these causes must be recognized and remedied.

Provision has already been made by the Congress in the Defense Highway Act of 1941, Public Law No. 146 of 1943, and the Federal-aid Highway Act of 1944, for the survey and advance planning of highway

construction projects, and the acquisition of necessary rights-of-way. The further need in remedy of the first of the causes mentioned is the similar and sufficient appropriation of immediately expendable funds by some States and their subdivisions for the advance acquisition of the necessary lands.

An adequate remedy for the second of the causes referred to will require the more difficult revision of legally established methods of public land acquisition in some States. The common defect of many of the varied methods used to acquire right-of-way, is that they postpone the public possession of required lands until the compensation due private owners has been finally determined by legal processes which involve many possibilities of delay and obstruction.

An illustration of the time that may thus be lost between the commencement of condemnation proceedings and the beginning of construction operations occurred in the widening of Woodward Avenue in Detroit, Michigan. Delay of almost a year and a half was occasioned in this instance largely by the death of a juror, which invalidated the whole procedure and required a new trial to be instituted. The case cost the city of Detroit \$100,000 and the public was deprived of the benefits that would have resulted from an early completion of the improvement. While other elements may have contributed to the delay, such as the very requirement of a unanimous jury, indiscriminate adjournments and lack of supervision by the court, provision for early possession pending the action would have facilitated the completion of the project.

Fortunately, there are among the methods in use, a few recently developed and closely similar in their essential requirements, that avoid these delays and yet afford ample protection of the rights of private property owners. Where these methods obtain, as in New York, for example, the condemning public authority, following required preliminaries, simply files a plat and description of the property to be acquired, and after notice to the owner of such action, the appropriation is complete and title to the property vests in the State. If offers of the condemner are then rejected, the former owner must file a claim for the value of the property with the State court, which makes an award after hearing all the evidence.

In the absence of adequate provision of this character, the rebuilding of Federal-aid routes and the logical development of the National system of interstate highways will inevitably be subject to long and costly delays and litigation, and public benefits of the needed facilities will meanwhile remain unrealized.

It is perhaps unnecessary to accent so strongly before a group which has experienced so many delays in their operations, the essentiality of the land acquisition program and the revision of the archaic laws governing the procedures. Both the public and industry will benefit by a correction of this situation.

WEIGHTED AVERAGE BID PRICES FOR HIGHWAY CONSTRUCTION
IN THE UNITED STATES AS SHOWN BY FORM PR 45

ITEMS		UNIT	* 1940 \$	1946 \$	Increase %
Roadway Excavation	(Borrow	c.y.	0.27	0.58	115
	(Common	c.y.	0.20	0.32	60
	(Unclassified	c.y.	0.21	0.40	90
	(Solid Rock	c.y.	0.59	1.14	93
Structural Excavation	(Common, Dry	c.y.	1.17	2.46	110
	(Unclassified	c.y.	1.19	2.85	139
Steel	(Pavement Reinforcement	lbs.	0.041	0.057	39
	(Structural "	lbs.	0.044	0.072	64
	(Structural Steel	lbs.	0.063	0.098	56
Bases	(Gravel and Clay Gravel	s.y.	0.21	0.35	67
	(Macadam or Stone	s.y.	0.58	0.92	59
	(Portland Cement Concrete	s.y.	1.72	2.76	60
Surfaces	(Gravel and Clay Gravel	s.y.	0.13	0.16	23
	(Bituminous Surface				
	(Treatment	s.y.	0.20	0.23	15
	(Bituminous Road-Mix	s.y.	0.28	0.44	57
	(Bituminous Intermediate				
	(Surfaces	s.y.	0.43	0.58	35
Pipe	(Bituminous Concrete	s.y.	0.75	1.10	47
	(Portland Cement Concrete	s.y.	1.61	2.65	65
	(Cast Iron - 18"	l.f.	3.55	7.07	99
	(Clay - 6"	l.f.	0.36	0.91	153
Structural Concrete	(Concrete Reinforced - 24"	l.f.	2.88	4.14	44
	(Galvanized Iron - 24"	l.f.	2.55	3.55	39
Structural Concrete	(Superstructures	c.y.	19.95	38.64	94
	(Substructures	c.y.	18.26	36.63	101
	(Foundations and				
	(Footings	c.y.	17.18	33.77	97

* Average of 3 quarters of the Calendar Year 1940.