

Paper presented by Thos. H. MacDonald,
Chief, U. S. Bureau of Public Roads, at the Eighteenth
Annual Convention of the Associated General Contractors
of America, at San Antonio, Texas, February 15, 1937.

There are three well defined trends that will have a major influence upon the highway improvement program and, thus, importantly affect the highway construction industry.

These are: Changes in design standards for the primary purpose of meeting safety requirements; changes in design and specifications and in construction methods to make full utilization of the new technical knowledge that has been developed to the point of general application; and the application on a constantly increasing scale of advanced planning of the highway system, including the orderly budgeting of the highway improvement program on the basis of known necessities and carefully determined priorities. The third trend will be affected, at least for some time to come, by the objective of providing opportunity for employment.

None of these trends is new. Each one in some degree is now in operation. The difference will lie in the preponderant influence which they will exert upon the future policies and annual undertakings and in their general application by all of the States. These are the outgrowth of the response of the State and Federal highway officials, and other governmental agencies, to improve the economy and the scope of the highway service, and reflect the increasing maturity of the approach to the highway problem.

Sound principles of engineering and administration developed from adequate data and records of experience are being rapidly built under the highway administrative structure, displacing lack of knowledge and indefinite objectives.

These developments will further accent the changing problems which have forced contractors to revise and revamp their organizations during the past several years. This thought is brought frankly before this Association for the purpose of being helpful in the further improvement of working relations between the contractors of the country and the highway officials. There are a considerable number of lingering sighs for a return to the time when the contractors' operations were not so closely determined by rules and regulations. That time is pretty definitely past. But this does not mean that there will be any lack of sympathetic consideration of well founded criticism, or any failure constantly to improve all requirements that do not make for higher class production with economy, or better conditions for contractors and the labor they employ.

In support of this assurance it may be of interest to review briefly some of the experiences of the past years when the emergency programs have been in operation. Probably contractors and highway officials would agree that the major difficulty with the rules and regulations which were first placed in effect by the Bureau of Public Roads grew out of the requirement relating to the selection of skilled labor. These criticisms had proven merit, and were met by

the elimination of the requirement, and definitely placing the contractor in the position of the sole judge of the employability of the skilled worker. However, there is the thought that the regulation failed more because of a lack of a sufficient number of workmen highly skilled in the various positions on the typical contractor's organization - a condition which seems to be growing in seriousness - than to any lack of effort on the part of the public employment services or cooperation on the part of the contractors.

The absorption of the available workmen in the skilled and intermediate grades has now justified releasing the choice of these wholly to the contractor, retaining for him, however, the services of the public employment agencies where sought. The regulations for the new programs retain the selection of unskilled labor through the employment agencies, but they do so to meet a definite need on the part of the contractors. To assist in handling the new problems of unemployment insurance and stabilization of employment, a plan is being worked out that will permit an individual of unskilled grade who has been employed by a contractor, after referral by an employment agency, to continue in the employ of the contractor until released by him. It will be noted that this improves the workman's status and at the same time assists the contractor by applying employment to a continuing organization rather than to the individual projects.

An analysis of 2961 Works Program highway and grade crossing projects shows that the four classifications of labor required in each organization are divided among the groups as follows:

	<u>Percent</u>
1. Executive, Administrative & Supervisory . . .	8.5
a. Superintendents . . .	1.5
b. Foremen	5.0
c. Clerical	2.0
2. Skilled	7.8
3. Intermediate	15.1
4. Unskilled	<u>68.6</u>
	100.0

From this it will be noted that only 7.8 percent of skilled workmen are required on the average to man organizations that will employ 15.1 percent of intermediate and 68.6 percent of unskilled grade workmen. Because of the indications that even this small percentage of highly skilled individuals is becoming difficult to secure, it is hoped that the change in administrative procedure here indicated will assist contractors to overcome any lack of skilled workmen by permitting them to retain and develop workmen of promise from the unskilled grades. The requirement for the fixing of minimum wages by the State highway department has, on the whole, worked well, although there have been cases of complaint, some of which are justified. The classification of positions has been criticized by labor unions in organized areas, but these criticisms have revolved around only a few positions. The new regulations have endeavored to

reach the cause of these complaints by changing the classifications. These changes have been made upon the basis of the increased quality of the product which should be secured by workmen skilled in the operation. While the principle carried by the former regulations as the basis for the classifications has permitted the contracting agencies to make changes where justified by the degree of skill demanded, this principle was not uniformly applied, and the criticisms have been met by a definite change in classification.

It is the judgment of the Bureau, after a careful study of the principle of establishment of minimum wages, that this practice is a protection both to the contractor and to the workman. The contractor is protected, particularly during a period of stress such as we have been passing through, in the fixing of the basis for competition. There can be no question that the contracting guild generally desires to treat workmen fairly and to pay as high a level of wages as is consistent with a reasonable cost of production; and the minimum wage requirements relieve those who would deal thus fairly with their workers of the unfair competition of a conscienceless minority who, by heartless exploitation of labor, would attempt to obtain an improper advantage. The protection to the workman is self evident.

It has been stated frequently in criticism of the fixing of minimum wages that the minimum becomes the maximum. If any authoritative refutation of this charge has been made, it has escaped our notice; so that the data now available from our highway contracts are of timely and important interest.

Minimum wages fixed by administrative action do not become the maximum wages. A table is attached which shows the established wage rates on the Works Program Highway and Grade Crossing Elimination projects, and the average rates actually paid to the first of January of this year. The statement is broken down by States, and the three classes - skilled, intermediate and unskilled labor. Almost without exception the rates paid in all three grades average considerably above the minimum established wage. In some States the variation is considerably higher than in others. In many of the States there is a range of minimum rates for each grade fixed by the highway department, and in a very large number of the States the average actually paid in the grade is above the maximum fixed for the grade. For example, in New York State in the skilled labor grade the established rates ranged from 75 to 80 cents per hour. The average paid was \$1.21. In the intermediate grade the range was from 55 to 65 cents per hour - the actual rate paid 71 cents. In the unskilled labor the range was from 45 to 55 cents per hour, and the average rate actually paid 52 cents. The range of wage in all classifications is so generally above the established rates as to fix the principle that contractors must, in making their estimates, figure on paying a higher rate of wage than the established rate. This table it is believed will be helpful since there is a considerable range in the degree to which this principle is applicable between the different States.

There are objections, of course, on the part of some of the contractors, at least, to the certification of pay rolls. The assertion has already been made that the fixing of minimum rates by the administrative agencies protects both the contractor and the workman. The retention of this policy necessarily carries the requirement for the continued submission of the certified pay roll. There will doubtless be agreement that the enforcement of the policy of minimum wages is dependent upon pay roll certification. This appears to the Bureau to be substantial support for the requirement, but debate would be fruitless, since it is a matter of Federal legislation applicable to all contracts of every nature involving the expenditure of Federal funds.

While there are other changes in the regulations, these comments cover those features concerning which there has been the principal comment and with which, doubtless, the contractors have had the most difficulty. It is believed that the changes in the regulations themselves and in administrative procedure will largely meet merited criticisms whether from contractors or from labor.

A very large program of highway construction with Federal funds and with a combination of Federal and State funds is possible for the ensuing year. The construction program for the 3-1/2 year period, July, 1933 to January, 1937, measured by the projects approved annually, totaled \$375,000,000, divided between Federal funds \$315,000,000 and State funds \$60,000,000. The Hayden-Cartwright Act provides Federal funds that will permit a new program

for the ensuing year of \$350,000,000, divided between Federal funds \$200,000,000 and State funds \$150,000,000. This new program, together with the balances of previous funds, will make possible a total program of new projects of \$560,000,000, of which the States must provide \$230,000,000. In addition, the work on going contracts yet to be done would make a total highway and grade crossing elimination program for the ensuing year reaching \$800,000,000. There is, however, an "if." It is "if" the States will supply the necessary State funds in the amount required by the terms of cooperation. The amount of State funds required to complete going contracts, together with the amount necessary to meet the allotments for this year for Federal-aid and secondary roads approximates \$294,000,000.

From time to time various rumors gain considerable circulation that the States are not in a financial position to supply the funds necessary to meet the Federal contributions. A statement of the facts is the best answer to rumors of this character. The real truth is that any States not in a financial position to meet the Federal allotments, with only one exception, are deliberately determined to use available funds for other purposes. Even this condition is an exception, applying to not more than three or four States. Even these latter States, which are slow in taking up their Federal-aid funds, or only meeting their allotments in part, are using through other agencies than the State highway departments for road purposes more than the amount required to meet the Federal funds. There is

no validity to any rumor that the States, with the single exception noted, are unable to meet substantially their Federal allotments if they so choose. The proof of this statement is found in the fact that of the 1936 apportionment of \$125,000,000, on January first all but \$13,000,000 had been definitely obligated, and half of this amount was credited to four States.

A new departure from the long established principles of the regular Federal-aid highway policies, as distinguished from those put into effect as emergency employment measures, is found in the inclusion of the grade crossing elimination program, the construction costs to be borne from Federal funds without the requirement of being matched by State funds. This policy is designed both to increase the economic utilization and decrease the hazards to the public, and to assist the railroads and the States in providing long needed improvements.

State legislation governing the division of costs for highway-railway crossing improvements between the various units of Government and the railroads, now represents an accumulation over a long period. Practically all of the laws contain outgrown requirements in view of the absolutely changed conditions which were definitely recognized in a recent pronouncement by the United States Supreme Court. While in time an equitable division of costs may be worked out, the financial policy now adopted is the only one that will permit effective present action. The fact that the construction costs are being met

from the Federal funds does not mean that either the States or the railroads are escaping a substantial share of the cost, since all property costs and damage are paid from other than Federal funds.

There are many desirable adjustments yet to be made in the grade crossing program. For example, the increased taxation upon the railroads growing out of capital improvements in some instances becomes a real and probably unfair burden, since the benefit largely accrues to the public.

There is also the question of land acquisition. In many of the States the laws for the acquisition of necessary lands for highway, and particularly grade crossing projects, are archaic, unworkable and unduly open to unfair settlement. Some method must be found to secure more promptly the land needed for necessary improvements. If a plan to secure lands with reasonable expedition were generally available, it would have the effect of speeding up the highway and grade crossing improvement programs more than any other factor and would incidentally release contractors from many expensive delays and other financial embarrassments.

Provision is also made by the Hayden-Cartwright Act for the construction of secondary and feeder roads with joint Federal and State funds shared in the familiar manner of the Federal-aid plan. The regulations will require that the work shall be done under the direction of the State highway departments, although the services of qualified county engineering organizations may be used for immediate supervisory purposes. The contract method will be required

whenever possible and practicable. State highway departments will be called upon to designate systems or groups of secondary roads on the basis of relative importance as revealed by State-wide studies, to consist initially of not more than 10 percent of the total highway mileage of the State. The attitude toward this new class of work can be summarized by the statement that the work will be carried out under policies closely approximating those that have obtained in the work on the Federal-aid system.

Brief reference has already been made to the necessity for changed designs and changed construction methods to provide safer and more durable highways. While there are involved many different considerations, one is of particular importance. That is, the application of known knowledge in the building of road grades. The advances which have been made in the technical knowledge of soils and their characteristics and behavior are of major importance. There is already fear that this knowledge may be applied superficially and wholly inadequately. Soil stabilization must be applied to the whole of the road grade including the natural ground on which the grade is superimposed. In bridges we have long considered the most important part of the structure to be that which is not seen and our conception of structural integrity begins with the foundation stratum which is carrying the load. In the building of road grades this same conception must be applied in a degree which has never been approached if we are to have fundamentally sound subgrade structures. Stabilization of soils must be applied not only to a few inches of the surface of the

subgrade, but the conception of stability must be extended to the earth stratum which can be relied upon to sustain the load indefinitely. The implications of changes in construction methods involved in this conception are apparent.

While this paper has dealt in a number of details, the purpose has been to disclose through this discussion an underlying approach to problems of highway administration and construction that will fairly correlate and harmonize the interests of the public and the construction industry which must be relied upon to produce these facilities for the public.

As a general commentary upon not only the past year, but upon the several years when public officials and contractors have worked under unusual difficulties and have attempted to meet highly serious problems, the construction industry has made a wonderful record for cooperation and for a generous submerging of personal benefits as a contribution to the public welfare. As a public official who has been in close contact with the highway work, it is a pleasure to make this acknowledgment as a deserved tribute to the construction industry.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS

ESTABLISHED WAGE RATES ON WORKS PROGRAM HIGHWAY AND GRADE-CROSSING ELIMINATION PROJECTS
AND AVERAGE WAGE RATES REPORTED PAID TO JANUARY 1, 1937

STATE	SKILLED LABOR		INTERMEDIATE GRADE		UNSKILLED LABOR	
	ESTABLISHED	PAID	ESTABLISHED	PAID	ESTABLISHED	PAID
ALABAMA	\$.55—\$.85	\$.84	\$.35—\$.40	\$.41	\$.20—\$.25	\$.24
ARIZONA	1.00	1.06	.62½	.72	.50	.52
KANSAS	.50	.54	.35— .37	.38	.20— .26	.21
CALIFORNIA	1.00	1.11	.68	.77	.60	.61
COLORADO	.90—1.10	1.04	.60— .70	.64	.50— .55	.51
CONNECTICUT	.75—1.20	1.06	.60— .75	.64	.50	.50
DELAWARE	.70— .80	.80	.40— .50	.47	.25— .35	.31
FLORIDA	.55— .70	.71	.35— .40	.41	.20— .25	.22
GEORGIA	.50— .55	.65	.30— .35	.37	.20— .25	.22
IDAHO	.75	.89	.60	.61	.50	.50
ILLINOIS	.75	1.08	.60	.73	.50	.56
INDIANA	.49— .66	.79	.39— .50	.50	.35— .42½	.42
IOWA	.60	.73	.50	.56	.40	.49
KANSAS	.60—1.10	.83	.40— .70	.47	.30— .50	.34
KENTUCKY	.75— .85	.91	.45— .55	.49	.30— .37½	.32
LOUISIANA	.75	.80	.45	.47	.30	.30
MAINE	.80	.84	.50	.51	.40	.40
MARYLAND	.41— .55	.72	.35— .45	.49	.27— .35	.34
MASSACHUSETTS	1.20	1.26	.75	.81	.50	.56
MICHIGAN	.45— .75	.77	.37— .58	.50	.32— .50	.39
MINNESOTA	.90—1.20	1.05	.65—1.00	.65	.50— .62	.52
MISSISSIPPI	.65	.77	.35	.39	.22½	.23
MISSOURI	.60—1.25	.86	.40— .65	.50	.30— .45	.36
MONTANA	1.00	1.10	.75	.82	.60	.62
NEBRASKA	.50— .60	.64	.40— .50	.46	.30— .40	.33
NEVADA	.90	1.00	.70	.72	.62½	.63
NEW HAMPSHIRE	.75	.85	.50	.54	.40	.41
NEW JERSEY	1.20	1.28	.65	.71	.40— .50	.52
NEW MEXICO	.90	.99	.60	.62	.40	.40
NEW YORK	.75— .80	1.21	.55— .65	.71	.45— .55	.52
NORTH CAROLINA	.55	.66	.35	.40	.25	.25
NORTH DAKOTA	.65	.73	.50	.54	.40	.40
OHIO	.65—1.25	.95	.50—1.00	.69	.45— .65	.55
OKLAHOMA	.75	.77	.50	.50	.30	.30
OREGON	1.20	1.22	.75	.78	.50	.50
PENNSYLVANIA	.55— .75	.72	.45— .60	.50	.35— .50	.40
RHODE ISLAND	.75	1.05	.60	.64	.50	.51
SOUTH CAROLINA	.55	.64	.35	.39	.25	.25
SOUTH DAKOTA	.60— .70	.67	.45— .50	.48	.35— .40	.35
TENNESSEE	.75	.82	.45	.47	.30	.30
Texas	.75	.87	.45	.49	.30	.31
UTAH	.75— .85	.94	.60— .65	.64	.50— .55	.51
Vermont	.60	.71	.40	.46	.35	.35
VIRGINIA	.60	.71	.35	.38	.25	.25
WASHINGTON	1.20	1.24	.75	.78	.50	.53
WEST VIRGINIA	1.00—1.10	1.04	.45— .50	.48	.40— .45	.40
WISCONSIN	.60— .90	.81	.50— .70	.57	.40— .60	.47
WYOMING	.80	.93	.65	.67	.55	.55
DISTRICT OF COLUMBIA	1.00—1.75	1.06	.60— .75	.62	.40— .45	.42
Dist. of Columbia	1.00	1.03	.70	.71	.45	.47