

selves despaired of their own evangel and accepted the good layout of badly-placed housing estates as a substitute. The absence, until almost the end of that war, of any serious discussion of reconstruction problems may have been a contributory factor. At any rate, it is on record that what ought to have been a town-building movement—it was the greatest opportunity that ever occurred in our history, not excepting the coming one—became a housing movement. I was one of the lone voices who said so at the time. It is useless now to cry over spilt suburbs. But it is salutary to remember that great opportunities can be lost by small thinking.

Times change and men change with them. Sometimes times change and men stand still, and because of that we are inclined to forget the important things they did when they were in tune with the times or ahead of them. On March 12, 1927, the President of the United States, in urging the completion of the Great Lakes-St. Lawrence Deep Waterway, said:

There is nothing that so lifts the spirit, the ideals and the faith of a people as confidence in their ability at great undertakings and the proof of this ability through fine achievement.

That was Herbert Hoover in 1927.

We have all the resources, the land, the water, the power, the minerals, the forests, the crops, the muscles, the skills, and the brains to make this a great nation; all we need is to use these resources; all we need is boldness, vision, imagination and courage.

THE EFFECT OF PRIORITIES ON HIGHWAY IMPROVEMENT

C. M. Hathaway,

Engineer of Construction, Illinois State Highway Department,
Springfield, Illinois

The OPM became a real necessity during 1941. Its origin was very simple: when the demand for certain materials far exceeded the supply and the requirements for defense projects had become critical, then some form of allocation, or priority, had to be given to protect them. The best illustration is the priority on steel. We were told in August that total defense projects, that is, the manufacture of planes, tanks, and other war materials, including the construction of army camps and war industry plants, needed about 45 per cent of the total 1941 steel production. Furthermore, it was very apparent that orders for civilian steel, as it is called, were greatly in excess of the remaining 55 per cent; something had to be done about it. Another more serious situation was the fact that, of the so-called civilian requirements, there were widely varying degrees of necessity. Even the Steel Division of the OPM did not have the situation in hand; it didn't know what jobber might be hoarding steel for the future; it knew that there might be large shipments of steel for very unimportant projects, and also that certain important near-defense projects

(and when I say this I allude to some very important highway construction) were not able to get steel enough to complete projects under contract.

Steel is only one example, but it is outstandingly the most important as far as highway construction is concerned. The OPM has published easily obtainable lists of the so-called critical materials. You should have a copy. You will be surprised at the things you can't get.

As I stated a moment ago, OPM places distribution under two general heads—defense and civilian—and priorities are granted accordingly. Normally highway construction was in the civilian classification unless it happened to be an access road to an army camp or some defense project works, or a part of the National Defense Highway System. About September first, the Public Roads Administration and OPM entered into a definite agreement whereby certain civilian highway projects could be placed in the category of defense projects, as I shall explain later.

In spite of all its defects and the evident confusion, I must express my appreciation of OPM. Something was needed and somebody had the nerve to do it; and we who criticize must realize the difficulties of developing a big organization around something which no one knew anything about. There were no so-called experts for this type of work, and many good men were drafted for their business ability and not for their knowledge of things as they are done in Washington. Many a good man in OPM who has been used to getting quick action found that when he went to Washington he was girded about by endless red tape which could not be cut until after due deliberation and study. On the other hand, perhaps some of that red tape was needed to outwit those individuals who are always looking for the short cut, or seeing somebody who knows another fellow who can work wonders in a political way.

I had my first contact with OPM along in August, when I attended a two-day seminar or school, and though we had to discount a lot of shortcomings which were encountered, I felt that OPM was doing the best it could under the circumstances. It tried to explain the necessity for everything, what it was doing and what its aims were. Every man was perfectly frank and honest in regard to his limitations and willing to accept suggestions. I returned from Washington with a very wholesome respect for OPM, although it was very apparent that it was in a mess.

I cannot attempt today to give you all the details in regard to priorities—that might take the rest of the week; but what I do intend to explain is priorities with reference to highway construction. In the time allotted I can only bring out some of the pertinent facts that may help you in your work.

There are OPM offices scattered throughout the country; there is one in Chicago, there may be one in Indianapolis. My

experience in Chicago is that the local office is more particularly for civilian or industrial purposes, and deals very little with highway matters. You might get acquainted with your local office. But you will probably work directly with Washington, through the Public Roads Administration and its district offices, as I shall explain later.

At the time I was in Washington, OPM made no pretext of circularizing its various orders and opinions; it quite frankly told us to get it out of the newspapers; so if you are trying to keep up-to-date information, get the *Chicago Journal of Commerce*, which generally publishes everything new. I wouldn't suggest that each county or city or road unit develop a priority section, but I am satisfied that there must be some centralized authority—either your state highway department, or maybe a state priority board—either one working through and with the Public Roads Administration. It so happens that one was established in the Highway Division in Springfield, and inasmuch as my bureau handles construction, I fell heir to this pleasant assignment. The man who is handling this work must keep up on everything he can, must correlate all the orders and opinions, and should make an occasional trip to Washington to get the latest information available but which isn't published. It is vital that an organization such as a highway department have one man acting as an intermediary between OPM and the contractor. This our department has been doing since September.

THE JOB AHEAD

How about highway construction in 1942? In spite of what anybody tells you, it must be realized that if you are going to build highways, or need to build highways, it must be done with the very minimum of such critical materials as steel. Again—why don't we put off all road building until after the war and devote all our energies where they belong, to defense? My answer is, if you mean routine highway construction, secondary roads and the like, we emphatically should call a halt. But now permit me to express a few opinions from a paper I presented to the AGC in Illinois a couple of weeks ago in regard to our future highway program. It is perhaps bordering on the radical, but it does bring out certain points that we may have overlooked at this critical time.

Shall we spend the state funds, Federal-aid allotments, carried over from 1941, and those available for 1942 construction? Your own highway commissioner can tell you that about a month ago the highway departments of 47 of the 48 states met in Chicago with officials of the Public Roads Administration and adopted certain definite policies relating to National Defense. One was that no work would be done by the states except where it might be of immediate value to the Defense

Highway System, and then only with the use of the very minimum of critical materials.

We are now in a tough war and we are making preparation for it in every way we can. If we need highway dollars to build planes or tanks, we should use them; but I do not in any sense concede that the construction and maintenance of any defense highway should be relegated to minor consideration, because I firmly believe that highway transportation is most vitally a part of our defense program—equally with the railroads and maybe just as much as ordnance works and the like—that, is as an integral part of them. The importance of highways was emphasized over two years ago when Herr Hitler began to make use of his remarkable German roads, and the value of that splendid system of roads has been all too well demonstrated.

Do not let any one mislead you by stating that we won't need highways in our defense work. If you wish to get a little clearer idea of my statement, sit down with your highway map of Indiana, as I did of Illinois, mark the defense plants, note the army posts, not forgetting to include those which are just outside the state line. I do not think that you will need any additional information.

I am satisfied that we are going to have a curtailment of traffic, that our highway revenues are going to take a sharp drop. Nevertheless, we are going to have a certain class of trucks and passenger cars using our roads; and we must have adequate highways for the quick transportation of labor and of troops here and there for short distances, for the hauling of local munitions supplies, for the movement of food-stuffs, and for the thousand and one other transports which can and logically will move over a system of highways rather than by rail. After you have come to realize that, bear in mind the value of a highway system, should it get to the stage where one of our rail heads might be bombed or the lines cut. Immediately there could come into service the vast fleet of trucks traveling our highways.

Here is yet another thought. It should be very evident to anyone that any primary highway cannot function for even a reasonable length of time without ordinary maintenance. If your primary roads in Indiana are anything like those in Illinois, you probably have many miles which are already obsolete and on which the maintenance is excessive, where alignments and grades are of the period of the early twenties, and which are not safe for intense and high-speed traffic. As in the case of Illinois, I imagine that they are the very roads to be incorporated in the National Strategic System. Gentlemen, it is my firm belief that this is where our available money should be spent for such repair and replacement as may be needed to put these roads in first-class condition for defense needs.

I will agree with anyone that we do not need many more new roads at State expense, but on a Defense Program I maintain that we have a duty to keep our highway systems not only in the shape they have always been in, but, in fact, that we must keep them in much better shape to handle the transportation of army equipment of every type when needed at a moment's notice. And do not forget this—roads are not built over night.

Pardon my digression from the main subject—but my point is strengthened by my previous statement that last September OPM and the Public Roads Administration recognized the importance of certain projects, then in the so-called civilian classification, by giving them a preferred rating and, so to speak, recognizing them as defense industries and entitled to the proper rating pertaining thereto. OPM still recognizes the importance of defense highways, as I shall now show you.

RECENT RULINGS

As I said, when priorities were first applied, the Public Roads Administration and the OPM worked out a very fine plan in which they gave certain priority ratings for certain classes of work, ranging from the A-1 class down to A-10, depending upon the importance and type of road. OPM will still recognize these priorities on uncompleted work until June 30, 1942, and they can be extended beyond that date if still not finished. Recently, a much stiffer policy was adopted, and every project which was not under contract was cut off. We were told that we must start all over again and submit new project statements. I will give you this ruling as briefly as possible. It applies to all future highway construction—yet even this new classification still recognizes the importance of highways as essential to national defense.

The former classification below A-4 has been abandoned, and projects are divided into "Classified" and "Unclassified." A classified project is one that may be developed on the access and strategic defense system, with possibly an important extension. It is definitely considered as national defense and it is entitled to a rating from A-1 to A-4.

It appears further that even classified projects must be "certified," or requested first by the Army and Navy Board, said certification being "an authority to build" submitted to the Public Roads Administration, which in turn recommends it to the state highway department as a project that may and should be undertaken. It would also seem permissible that a state highway department might initiate a project and refer it to the Public Roads Administration to be given consideration by OPM and the Army and Navy Board for their certification and, if such certification were given, the work might proceed as in the first case. I am thinking of this procedure for the expenditure of our regular Federal-aid allotment and our state funds now available—and our State is of this mind,

understanding that it will apply only to highways on the Strategic System, or an important extension of vital defense importance.

Everything that is not on the Strategic Highway Defense System or Access System falls into the unclassified list, and this would include primary Federal-aid not on the Strategic System, secondary Federal-aid, grade separations, state highways, and county, city, and township projects. There is no specific priority rating guaranteed by OPM; but should an unclassified project be deemed advisable, it may be initiated by the local governmental authority, referred to the Public Roads Administration, and by them passed on to OPM for the usual consideration (presumably it must be certified by the Army and Navy Board also).

OPM has expressed itself as follows in regard to unclassified projects: Application should be made only (1) when the work is of direct importance to the National Defense or is essential to the health and safety of the civilian population; and (2) for critical materials which are essential and for which non-critical materials cannot be substituted. *Application should not be made for proposed work which may represent a desirable improvement but which cannot be considered essential.* As I before stated, OPM may give such a project a rating stated in the classified list, or, if it is deemed of some less defense value, it may be assigned a rating below A-4 and up to A-10, or it may be rejected entirely.

I have endeavored to find out what attitude the OPM or the Army and Navy Board might take in case of a project to be built with state, county, or city funds, which does not involve any critical materials and where no priority is necessary. The question has not been answered, but it seems to me that it is going to be pretty difficult now to initiate any project that doesn't use some semblance of critical material, because we know today that there is a ban on trucks and tires, and there may be an impending car shortage or some local restrictions that might place a job in a temporarily critical status.

OPERATION OF HIGHWAY PRIORITY RATINGS

P-19-e is the priority rating which the Division of Highways ordinarily uses, and it is secured for the contractor through the Public Roads Administration and OPM. It is adapted to those instances where there may be several critical materials to be supplied from several different sources, and it is extendible. There are suitable forms to be made out by the highway official requesting the priority; they are referred directly to the Division Engineer of the Public Roads Administration, who passes on them and then sends them to the Public Roads Administration office in Washington. From that office the request goes to OPM for decision. The approval or denial of this

request by OPM comes back through the Public Roads Administration. I presume that some group in the State of Indiana, probably the highway department or a priorities board, has contact with the Public Roads Administration and the OPM, and that they can give you full details upon request.

There is also a PD-1 form which may be used by contractors, although it may be used by a highway department for its own supplies. This form is not extendible, and it is designed primarily for the person who wants only one particular item to be supplied by one particular firm. It is usually requested by the contractor, but it may be accompanied by a letter of sponsorship, explaining the necessity for the material, such a letter to be written by the public official interested in the project.

The third priority method applies particularly to maintenance and is also very important to contractors—that is the automatic A-10 or the P-100, which is a blank priority rating permitting certain industries, including contractors and maintenance men, to secure critical materials for specific purposes, chiefly repairs. It is not necessary to send it through the OPM office. This is an automatic grant handled by means of a certification or sticker which the applicant places on his order; but it must be borne in mind that whenever this Form P-100 is used, the user is responsible for reporting his action to OPM. Improper use is subject to a strict penalty. P-100's are extendible by the supplier. By them you may apply for repair parts, but not for new equipment. Maintenance men and contractors will find it very useful to get the complete details, as it may help them out of a real difficulty.

So far as highway projects are concerned, they are pretty nearly standardized under the PD-1, the P-19-e, and the P-100. It seems to be a very good working plan, although it does take time—let us say 30 days for the average project. There is much red tape, but the plan is designed to help where a legitimate (on the defense system) project is proposed.

EMERGENCY DESIGN AND CONSTRUCTION

In considering highway construction of any type whatsoever this year, all governmental units should consider first only such work as may be of defense value, and in addition they should study the use of such designs as may keep the use of critical materials to an absolute minimum or eliminate them entirely. For instance, a new design for portland-cement concrete pavement might increase the thickness and eliminate mesh reinforcing, and suitable substitutions might be made for longitudinal and transverse joints. In our own state we have found that designs of this character can be used without any serious reduction in strength of the resulting product. On bridge construction it is imperative that all steel, particularly structural

shapes, be eliminated where possible by the substitution of reinforced concrete. Wood piling might be substituted for concrete or steel shell piles; small culverts that ordinarily are built of reinforced concrete might be of plain concrete or tile; and emphasis might be placed upon the construction of gravel or crushed-stone roads with bituminous surfacing, having in mind that none of the materials thus involved are at present on the critical list. Study also might be given to the use of local materials that would reduce rail haul.

In addition, thought should be given to construction methods, and I feel that you should not introduce any changes in construction policies which require the contractor to change his present equipment. In so far as contracting organizations are concerned, we should solicit co-operation among them, even perhaps to the extent of interchange of equipment, thus reducing new equipment to an absolute minimum, with particular emphasis on the conservation of trucks and tires.

Now in conclusion. Let me give you a few "do's" and "don't's" on priority:

Recognize the accepted method of securing priorities. If you have a priority board, work through it. If you are operating through the Public Roads Administration, work through it.

Don't listen to the chap who tells you that he has a political pull and can see a certain man in Washington to get your priority through. Perhaps he can, but you are "gumming up" the regular procedure.

Don't listen to the suave salesman who tells you he knows where there are a thousand tons of steel or enough copper for anything you want. Probably he was the double-crosser who was storing steel last summer when we should have been receiving it for some critical construction.

Don't try to magnify the importance of your own particular project, hoping to mislead the Public Roads Administration and the OPM—it won't last long and may lead the Public Roads Administration or OPM to be suspicious of everything you send it.

Don't be discouraged because you don't know all about priorities. Nobody does, and I have met quite a number of chaps who are supposed to be experts.

Don't let the civilian industry or the equipment man tell you how you can do it. He is talking about civilian industry priority and there may be another OPM policy applying to highways.

Above all things, don't expect too quick action. Even last fall we figured on 30 days from the time we submitted a project to the time we got a rating—six months or more on structural steel. Even though your contractor gets terribly impatient, the "barber-shop order" still prevails, and the best of feeling will exist if you observe that ancient custom.

Don't forget that getting a rating is one thing and getting the material is another. You may have a dandy A-3 rating all ready to ship and then there may come in a big order on an A-1 rating, whereupon you will step out of line and wait for the A-1 material to be shipped.

Try to look at this whole thing in a rational manner and realize that we are at war and, pessimistic as the viewpoint now is, try to keep a stiff upper lip; try to be as optimistic as possible. Remember your viewpoint as well as the viewpoint of everybody else in this room is going to be reflected ten-fold in our every-day contacts. I am heart and soul and 100 per cent for total defense and everything needed to make is possible. I am also firmly of the opinion that we should be ready to go when we are required to, but on the other hand I do not think we need to stand around with our hands in our pockets or to stop the ordinary wheels of industry unnecessarily when we can be doing something constructive in the interim. Business must go on as far as practicable; otherwise who is going to pay the income tax and who is going to buy Defense Bonds, which, after all, are another vital part of this Defense Program?

LIFE CHARACTERISTICS OF HIGHWAY SURFACE TYPES

Robert Winfrey,

Research Associate Professor of Civil Engineering,
Iowa State College, Ames, Iowa

NOTE: Professor Winfrey's address was extemporaneous, supplemented by slides. This brief abstract of his subject matter is from *Public Roads*, March, 1941.

Annual increases in usage of motor vehicles have caused structures and roadways, built to the most modern standards as recently as 10 years ago, rapidly to become obsolete and in many instances to be replaced or reconstructed. With this in mind, an interesting study was started in 1934 by the Iowa State College and later incorporated as a phase of the state-wide highway-planning surveys, designated as road-life studies, inaugurated in the several states under the direction of the Public Roads Administration.

The present report is confined to an analysis of data concerning the service-life characteristics of various surface types compiled for the rural portions of the primary state or Federal-aid systems of 26 states, covering approximately 210,000 miles of construction up to January 1, 1937. In addition, an analysis was made of the disposition of mileage at the time of retirement, involving slightly over 56,000 miles of retired surfacing in 23 of the 26 states. Retirement of a road surface is considered as being effected when (1) the