

# THE UNIVERSITY OF MISSOURI

# Bulletin

ENGINEERING REPRINT SERIES

Reprint Number 9

\*\*\*

Engineering Experiment Station  
Columbia, Missouri

## HOW TO PLAN AND PAY FOR FOR THE SAFE AND ADEQUATE HIGHWAYS WE NEED

A Plea for an Over-all Presidential  
Transportation Commission

HARRY RUBEY ♦ Professor and Chairman of Civil Engineering

Reprinted from the General Motors

BETTER HIGHWAY AWARDS

First Prize Winner for Missouri

1953

COLLEGE OF ENGINEERING  
THE ENGINEERING EXPERIMENT STATION

The Engineering Experiment Station was organized in 1909 as a part of the College of Engineering. The staff of the Station includes all members of the Faculty of the College of Engineering, together with Research Assistants supported by the Station Funds.

The Station is primarily an engineering research institution engaged in the investigation of fundamental engineering problems of general interest, in the improvement of engineering design, and in the development of new industrial processes.

The Station desires particularly to co-operate with industries of Missouri in the solution of such problems. For this purpose, there is available not only the special equipment belonging to the Station but all of the equipment and facilities of the College of Engineering not in immediate use for class instruction.

Inquiries regarding these matters should be addressed to

The Director,  
Engineering Experiment Station  
University of Missouri  
Columbia, Missouri

THE UNIVERSITY OF MISSOURI BULLETIN

VOL. 55, NO. 40

ENGINEERING EXPERIMENT STATION REPRINT SERIES, NO. 9

Published by the University of Missouri at Room 102, Building T-3, Columbia, Missouri. Entered as second-class matter, January 2, 1914, at post office at Columbia, Missouri, under Act of Congress of August 24, 1912. Issued four times monthly October through May, three times monthly June through September.

... 500

November 22, 1954

## HOW TO PLAN AND PAY FOR THE SAFE AND ADEQUATE HIGHWAYS WE NEED

### Introduction

Kipling has said, "Transportation is civilization." It must be improved, but how?

The recent election constituted a mandate for change. Whether a better new foreign and domestic policy will result remains to be seen but our people definitely are in a mood for action and efficiency in their affairs. The time and popular temper are ripe for casting off the shackles binding our automotive traffic and trying something more promising. As a few examples of this frame of mind:

1. Large sums of private money are being raised without difficulty for toll road highways where they are thought to provide the answer.
2. As in St. Louis, people now are willing to forego old parking and traffic conveniences in order to secure better traffic regulation, where heretofore such a change was stenuously opposed. There is a new birth of so-called "Civic Progress" which welcomes traffic restrictions and replaces decades of apathy with militant action for reform.
3. Secretary of Defense Charles E. Wilson will have popular backing in his drive for efficiency and economy and his order barring a start of new defense projects until they have been reviewed and justified is in line with present public feeling. The plan proposed later applies to all transportation that same type of coordinated treatment now being administered to defense by Mr. Wilson.

### Conformance to Trend of Times

To choose a plan that will be successful we must follow the trend of our times as so soundly expressed in the recent book entitled "The Big Change" by Harper's long-time editor, Frederick L. Allen. He points out that for fifty years the United States has not progressed towards Socialism, but around it to a new type of cooperation between industry, labor, the government, and the public. This cooperation maintains coordinated competition in line with the needs of these great groups, thus giving the benefits of Socialism without its manifest disadvantages.

By going along with this trend of cooperation and competition under a firm government which conscientiously puts efficiency above politics, our highway program will be resolved adequately. While there may be minor dislocations and "growing pains" in adapting the plan proposed later in this paper to the trend described by Editor Allen, the final effectiveness, certainty, and consumer satisfaction will be much improved. We will follow enthusiastically an officially established procedure headed towards efficiency, rather than tolerate the frustrating and ineffective disputes and inaction of the present.

## **The Overall Transportation Problem**

Our whole transportation problem has grown like Topsy and it must be coordinated under a general transportation program that will increase effectiveness for peace or war. If we do not perfect it now in peacetime, a worse substitution will be forced upon us in wartime with greater embargoes, disruptions, conflicts, inefficiencies, and logistic difficulties of all kinds.

In the writer's opinion the capacity, convenience, safety, and cost of transportation can be improved perhaps fifty percent by the proposed program later outlined, with practically no expense. The program will be accepted readily because our country is sick and tired of inefficiency and lack of that efficient planning needed to maintain our American way of life, perhaps even to save our skins.

Transportation agencies include highways, railways, airways, helicopters, waterways, pipe lines, electrical transmission lines, beltways, tramways, and so on. Each of these means of transportation is more efficient for certain types of commodities and service, as for example airways for light speedy distance service, waterways for slow heavy service, and helicopters for short speedy use. Of course there are some areas where the various means of transportation overlap but in general each provides its best service only under limited conditions.

The transportation of coal from a mine to the consuming centers illustrates the overlap just mentioned. We find that it can be moved by rail, truck, beltways, tramways, barges, electrical transmission lines (by turning it into power at the mine mouth), pipelines (by chemical processing or pulverizing), and perhaps others. However, for a particular mine, only one or two of these means will be feasible, economical, and in the public interest. The best means of moving the coal will vary with the quantity to be transported and other factors.

Attempts to serve outside its proper field cause conflicts and inefficiencies harmful to each transportation method. Each method will improve rapidly if given the green light under a coordinated master plan.

## **The Plan**

A bold and comprehensive plan which catches the imagination is essential.

Step 1. Therefore the first obvious step towards efficient transportation is for a presidential Commission to study and hold hearings covering the entire field of transportation and to devise means for fairly allocating the various commodities to be transported and the services to be performed among the agencies that can handle them most efficiently. This will save waste, eliminate the congestion and troubles now existing in this respect, and stabilize and narrow the field of each agency so that it can concentrate with confidence on long range plans for future improvement.

Step 2 The second step is for the Commission to allocate regulation and subsidy fairly as between the various transportation agencies. At worst it might approve most existing subsidies and regulations and settle these disputed matters finally so that we can pass on to more constructive phases of action.

Step 3. The Commission then would recommend the extent to which federal, state, and local government should contribute funds, and recommend any legislation needed to make this money safely and steadily available (stopgap amounts being very wasteful) so as to supplement and encourage investment of private capital of both venture and investment nature. The Commission would approve present fund raising procedures or recommend new ones.

Step 4. The Commission then would be separated into subdivisions such as one for highways. This highway subdivision, working with all private and governmental agencies in accordance with the trend explained in Editor Allen's book, "The Big Change," would reach suitable solutions for the highway transportation disputes, uncertainties, and inaction now facing us, including safety (speed regulations, etc.) adequacy (highway and street capacity), maximum truck capacities, toll roads (where are they suitable and how best connected with one another), parking congestion (an unsolved problem), taxation, and so on. Greater permanent support would be forthcoming regularly for a long range plan.

### **Why the Plan Will Prove Practical in Detail**

A Commission might easily be formed with members from the Interstate Commerce Commission, the Federal Power Commission, the Federal Bureau of Public Roads, the Civil Aeronautics Administration, governors of states, manufacturers of automotive and transportation equipment, associations of users of transportation, oil companies, and others.

Once the broad allocation of traffic among the agencies and other fundamental policies are established, each of the transportation agencies (for example highways) could concentrate on the service it is able to perform best in the field where it serves best. There is no dearth of talent in the highway field to solve all its problems such as speed, loading, safety, and continuous progress of its service. Only approval of high authority and the "go" signal are necessary.

To suggest the possible improvements in automotive transportation, we must also note examples of possible progress in other transportation fields. Time, February 9, 1953, states that future aircraft may not be the biggest or fastest, despite recent trends. A prediction of speed is made for long passenger hauls of 600 miles per hour, of short passenger hauls of 300 miles per hour; and for under a 200-mile range, helicopters.

Huge ships like the Queens Mary or Elizabeth are not being built now.

There will be development in beltways, such as that projected in Ohio for coal and ore; or

the dream of a series of variously-speeded, adjacent moving beltways for urban transportation of commuters; and many other unanticipated improvements.

Trucks and cars will not continue without progress. In a highway study we should note that at least one mine is using trucks 30 feet long, 11 feet high, and 11 feet wide with a total loaded weight of more than 100 tons. The railways were forced to develop better track for heavier and faster traffic. May not highways face the same obligation for limited mileage?

“Piggyback” cooperation between truckers and railways gives great promise.

If we properly allocate traffic among the various agencies they all will be free to adapt their service and development to the public interest and we will progress accordingly. But all agencies cannot be all things to all users.

Improvements for all agencies are endless and unforeseeable. They will develop best if given a chance under a master coordinating commission. When we use the highways for traffic suited thereto, regulating and controlling it under the proposed Commission and such existing agencies as Congress, legislatures, highway commissions, highway patrols, the courts, etc., then automotive transportation will be handled and financed adequately and will continue to grow with popular demand. Larger replacements and more in the way of additional automotive transportation then will be required.

### Why the Plan is Timely

Because we are in a desperate world condition, could easily enter a devastating war, must tighten our belts for a long cold war or recession, and are sick of inaction and inefficiency in domestic matters, we will be willing to give up our petty rivalries, wishes, and vested interests and cooperate for national welfare. If we do not do this in peacetime, it will be imposed on us in a more arbitrary and harmful way by embargoes, bomb damages, and wartime regulations which practically stop highway construction. And eventually we will be forced to it by a constantly increasing plague of traffic troubles. There will never be a better time than now. Every delay throws us farther behind our needs. If properly promoted and publicized, most people will support “The Coordinated Transportation Commission.” No harm, and perhaps the maximum of relief, will result from this plan.

Why not now?

Prof. Harry Rubey  
Department of Civil Engineering  
University of Missouri  
Columbia, Missouri

State: — — — MISSOURI  
1st. Prize Winner

## PUBLICATIONS OF THE ENGINEERING REPRINT SERIES

Reprint  
No.

- \*1. Response of Circuits to Steady-State Pulses, by Dr. L. Waidelich, Professor of Electrical Engineering. Reprinted from the Proceedings of the I. R. E., Vol. 37, No. 12, December 1949.
- \*2. Heat Transfer to Water Boiling Under Pressure, by E. A. Farber, Graduate Student, now Assistant Professor of Mechanical Engineering, University of Wisconsin, and R. L. Scorah, Professor of Mechanical Engineering. Reprinted from the Transactions of The A. S. M. E., May 1948.
- \*3. Steady-State Waves on Transmission Lines by D. L. Waidelich, Professor of Electrical Engineering, (1950).
4. Theory of the Adiabatic Bubble, by Ralph Scorah. Reprinted from the Proceedings of the Midwestern Conference on Fluid Dynamics, J. W. Edwards, Ann Arbor, 1951.
5. Equivalent Load Method for Analyzing Prestressed Concrete Structures, by Robert B. B. Moorman, Professor of Civil Engineering. Reprinted from Journal of the American Concrete Institute, Vol. 23, January, 1952.
6. Design of Low Frequency Constant Time Delay Lines, by C. M. Wallis, Reprinted from Transactions American Institute of Electrical Engineers, Vol. 71, 1952.
7. The Engineer Becomes A Professional Manager, by Harry Rubey. Reprinted from Journal of Engineering Education, Vol. 43, 1953.
8. Use of the Centrifugal Governor Mechanism as a Torsional Vibration Absorber, by O. A. Pringle, Assistant Professor of Mechanical Engineering. Reprinted from the Transactions of the American Society of Mechanical Engineers, Vol. 75, 1953.
9. How to Plan for the Safe and Adequate Highways We Need, by Harry Rubey, Professor and Chairman of Civil Engineering. Reprinted from the General Motors BETTER HIGHWAYS AWARDS, 1953.

\* Out of Print





University of Missouri Libraries  
University of Missouri

MU Engineering Experiment Station Series

Local Identifier           Rubey1953

Capture information

Date captured            2018 June  
Scanner manufacturer    Ricoh  
Scanner model            MP C4503  
Scanning software  
Optical resolution      600 dpi  
Color settings          Grayscale, 8 bit; Color, 24 bit  
File types                Tiff

Source information

Format                   Book  
Content type             Text  
Notes                    Digitized duplicate copy not retained in collection.

Derivatives - Access copy

Compression             LZW  
Editing software         Adobe Photoshop  
Resolution               600 dpi  
Color                    Grayscale, 8 bit; Color, 24 bit  
File types               Tiffs converted to pdf  
Notes                    Greyscale pages cropped and canvassed. Noise removed from  
                          background and text darkened.  
                          Color pages cropped.