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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
BUREAU OF PUBLIC ROADS
WASHINGTON, D.C. 20591

THE ROAD AHEAD

Address by E. M. Cope, Chief, Highway Statistics Division
at the North American Gasoline Tax Conference,
Santa Barbara, California, September 11, 1968

I am pleased to be here with the people so largely responsible for the efficient administration of what is probably the most equitable public levy ever devised—the gasoline tax. And I am also glad to be with representatives of the petroleum industry, in this era of increasing understanding of the place and importance of highway transportation in the total economy.

If there really is an American dream, the automobile has an important place in it.

Sometime this fall or early next year, our motor vehicle registrations will pass the 100 million mark. We could leave the trucks and buses in the garage and still have room for everybody—the whole 200 million of us—to ride at the same time in our automobiles. And that's not all. We can all sit in the front seat, and still have room to spare.

By 1975, we expect to have more than 118 million motor vehicles, and the total should exceed 130 million by 1980. And these are only the powered vehicles, with four or more wheels—no motorcycles or trailers.

The Nation will need well over 8 million automobiles and more than $1\frac{1}{2}$ million trucks and buses in each of the next few years to replace worn out or wrecked vehicles, and to allow for growth; and by 1976 we will need over 10 million automobiles plus 2 million trucks and buses each year. By 1980 we'll have a total motor vehicle market in excess of 13 million vehicles a year, and I'm still not counting trailers and motorcycles. The 130 million vehicles that will be registered in 1980 will be using 107 billion gallons of motor fuel in that year.

Highway transportation is a tremendous creator of employment. Our three largest corporations, and seven of the ten largest, are automobile and oil companies. Highways not only make jobs—the dispersal of industry they permit, in fact, takes the jobs to the people as well as the people to the jobs. But the capability and quality of highway transportation depend on the road as well as the vehicle. There are times when we seem to forget this, and I am not sure that we fully realize that the continued growth of these job-producing industries depends a great deal on the growth of highway capacity.

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I am disturbed by statements or actions that seem to assume that we can complete a given series of highway projects or a program, and then sit back with folded arms. We can't. Highway capacity must keep pace with the growing needs of the Nation, or that growth will be stifled. But to have an adequate highway system, we first have to solve the money problem, which seems eternal. And if highway capacity does not keep pace with the Nation's growth, at least part of the blame will be on our own heads. On this point, I'd like to borrow a passage from another recent talk I made:

"I have always thought that a considerable part of our money problem is our own fault. We have been so busy with the day-to-day problems of building and keeping up the highways that we have not prepared ourselves for rendering an understandable accounting to the public. We summarize highway systems and surfaces in thousands of miles, and speak fluently of highway costs in terms of millions of dollars. But I think we fail, too many times, to get any real understanding of the relationship between these figures and the individual road user's payments. We need to get down to the more understandable language of the pennies and dimes and dollars that are the charges, in the form of taxes, that the user pays for the support of highways. And we need to show how these charges fit in—what part they are—of the total cost the highway user must pay for the vehicle and the road to run it on. We need to tell it to the road user in language he understands.

When we choose an automobile, we pick the model and the features we want on it, and pay the going rate. When we upgrade the quality of the vehicle, or add power steering, radio, air conditioning, and other features, it goes into the price. In many respects, it's the same way with the road to drive the car on. When we surface a dirt road, or go from a 10-foot lane to a 12-foot lane, or upgrade the safety features of a road, or build a time-saving bypass, it goes into the price of the road. When labor and material costs in Detroit go up, the cost of cars goes up. When road wages and materials go up, the cost of building and maintaining roads goes up.

We are in an affluent state of mind when we buy automobiles. It just isn't true that we simply want to go from one place to another by the cheapest and quickest way. We want to go in style, in air-conditioned cars with powerful engines, automatic transmissions, and a sizable list of optional equipment that make our trip more pleasant. We thoughtfully select the vehicle and its equipment, and accept the cost of each element. We're even pretty particular about the appearance of the vehicle. We ought to be at least as interested in the road system we drive it on. A 10-year old Ford on a good highway gives a better ride than a brand new Cadillac on an outmoded, congested highway.

I think it would be helpful if we took a hard look at the costs of owning and operating an automobile, in terms of cents per gallon. That's the way we pay for roads. Motor vehicle operators, it has always seemed to me, are always keenly aware of the gasoline tax and somehow believe it to be a heavier burden than it really is. Maybe that is because he can say "yes" or "no" to some of the other options, but the gasoline tax is not optional. Anyhow, let's make some comparisons. The California gasoline tax rate is 7 cents a gallon (the National average of State gasoline tax rates is 6.6 cents a gallon and the Federal gas tax is 4 cents a gallon). An automatic transmission also costs about 7 cents a gallon. To explain this, the cost new is a little over $200, equal to about 3 cents per gallon for each of the 7,000 gallons the car will use in its 100,000-mile journey from the assembly line to the junkyard. To this 3 cents a gallon we add 4 cents a gallon that is the cost of the automatic transmission efficiency loss (about 12 percent, or approximately 1/8 of the 34 cents a gallon price of gasoline). The customer pays an equivalent of 7 cents a gallon gasoline tax just to keep from shifting gears.

We are not used to looking at automobile costs in this way, but the comparisons are interesting—and revealing. Continuing our businesslike examination, an automobile air conditioner with the tinted glass and heavy duty battery that go with it costs about $420 just to buy it new. This is equal to 6 cents a gallon on every gallon of gasoline the car will use in its lifetime. Then if we take a very conservative estimate of the loss of just one mile per gallon to allow for carrying the air conditioner's weight and operating it, we add another 2 4/10 cents a gallon, making a total of 8.4 cents a gallon for air conditioning.

In the spring of 1968, the Bureau of Public Roads estimated that the total cost of buying and operating an automobile a total of 100,000 miles over a 10-year life would amount to $11,024, and this doesn't include any interest or financing charges. This is for an "average" vehicle that cost $2,800 new, and that in its 10-year life the vehicle would use 7,000 gallons of gasoline—enough to drive its 100,000-mile trip from the assembly line to the end of its days at the junkyard 10 years later. If the total cost, including insurance, repair, maintenance, parking charges, and everything else (but not including any finance charges) that goes into the ownership and operation of an automobile could somehow be collected as part of the cost of gasoline, the gasoline would cost a $1.57 a gallon. Of this, State and Federal taxes would account for 17 cents, and in general, be used for highway construction, maintenance and administration. In terms of cents per gallon, the remaining $1.40 would include 40 cents for depreciation, 25 cents for repairs and maintenance, another 25 cents for garaging, parking and tolls, 21 cents for gasoline, 20 cents for insurance, and smaller amounts for tires, accessories and other costs.

The $1.57 per gallon buys only the basic car with automatic transmission and radio. Power steering and power brakes would add another two cents a gallon. You could also buy deluxe wheel covers and a vinyl top for two cents a gallon. Bucket seats can be had for a little over 1 cent a gallon, but air conditioning would cost about 8.4 cents, and you can add whitewall tires for only a penny a gallon more than blackwall tires would cost you. In case any of these figures make you uneasy, you can easily figure them out for your own car.

Let's have a close look at the tire figure. The extra cost of whitewall tires (above the cost of blackwall tires) on a new car is a little over \$36. During the life of the car it will need 11 or 12 replacement tires at a premium of about \$3 each or another \$33. The total—about \$70—is just equal to 1 cent a gallon on all the gasoline a car will use in its lifetime. One cent a gallon would have increased by one-fourth the amount of the State funds California had available for road construction in 1967.

A lot of pride, and comfort, and wealth are wrapped up in automobiles. We have reached eagerly for each improvement, each innovation. But as a Nation, we seem to have had difficulty in understanding that we waste a lot of the potential service and comfort of the vehicles unless we match them with highways that allow us to take advantage of their capabilities. We're willing to pay the going rate for features on the automobile, but can't quite master the concept that satisfactory highway transportation requires a combination of vehicle <u>and</u> road, not just one or the other.

Our problem in keeping the road system up to handling the vehicles is the combined result of many factors. Possibly we're willing to spend money for the automobile and not for the road because we personally own the automobile, but have no sense of ownership of the road. Another reason may be that, in current language, we have a "hang-up" on taxes. Tolls, we understand. We see what we get, and associate the payment with precisely the road we use. But the gasoline tax has always suffered from guilt-by-association with taxes in general, even though it is sort of a cut-rate toll that dispenses with the expense of toll gates and gatekeepers. However, the public aversion to taxation is understandable; and these would be dangerous days indeed if public interest in taxes were to be dulled by lack of concern or a sense of futility.

Another, and perhaps the most important, of the problems faced by highway authorities is the long-range trend of prices. Unfortunately, it is also the least understood. The power of the highway administrator to build and maintain highways erodes as prices go up.

Finally, we come to a factor that we just can't put a price on. As automobiles have changed, so have roads. The car that we thought adequate 20 years ago could not come anywhere near meeting today's standards of safety, power, comfort, or reliability.

As our concept of acceptable vehicles has changed, so has our concept of acceptable roads. The whole problem of cost structure is compounded by changes in highway standards. Considerations of safety, riding comfort, and speed, and the more recent stress on social factors—appearance, economic impact, noise, and a broadened concept of the part of highways in general transportation policy—have given us a whole new concept of what it takes to make an acceptable highway. These trends are good—they make for better, safer, more comfortable transportation. But they cost money.

The index of highway construction costs is now more than 275 percent of the 1940 figure. This means that a 6.5 cents a gallon gasoline tax today has the purchasing power that a 2.45 cents a gallon tax had in 1940. So the 6.5 cents gasoline tax of today buys only 61 percent as much highway construction as the 4.0 cents a gallon tax bought in 1940.

In 1940, a haircut cost 50 cents here in Santa Barbara, I'm told, and the California gasoline tax was 3 cents a gallon. Today, a haircut costs $2.50, and if the gasoline tax had gone up at the same rate, it would be 15 cents a gallon.

Most of the other taxes we pay today are structured to fluctuate— and I say this gingerly, because I really mean "go up"—as price levels fluctuate. The income tax, the sales tax, real estate taxes, all automatically follow price trends. But the gasoline tax is the backbone of highway finance, and a gallon of gasoline stays 231 cubic inches, no matter what happens to its price. And the tax rate stays the same, unless the legislature changes it. The fact that highway revenue is almost entirely derived from fixed units, the gallon and the vehicle, with no ad valorem factor to adjust the yield to the prices of the marketplace almost condemns highway revenues to lag behind highway costs. Thoreau once said, "The mass of men lead lives of silent desperation...." I think this could also be said of the men who must try to make an ever-shrinking dollar meet an ever-expanding highway need.

Our road-user taxes determine the kind of roads we will have. When road revenues fall behind road needs, sooner or later we accept highway standards that do not permit realization of the potentials of our vehicles. A State can go on for a while by borrowing to bridge the gap between its current funds and the expenditure level needed to keep up its highways, but so can a man live beyond his income for a while by going into debt. This is not to say that borrowing, or to use a fancier phrase, credit financing, doesn't have its place. A prudent man borrows to finance a home, or a congregation borrows to build a church, and we think well of them. So should a State borrow to expedite a construction program, or meet major outlays that cannot reasonably be met from current income. But borrowing should be part of a plan, not a substitute for one.

Today, California has a 7 cents a gallon gasoline tax. It costs the average automobile user a little less than a dollar a week. I want to make it crystal clear that I do not suggest a tax rate increase, but think it interesting to ask how many California highway users have the faintest idea that a vinyl top on a car costs as much as 1 1/5 cents a gallon gasoline tax for the life of the car? How many know that bucket seats cost them more than would a 1 cent a gallon tax that would increase the State highway construction revenue by over 25 percent? Who would believe that the depreciation alone on a $2,800 car costs as much as a 40 cents a gallon gasoline tax would?

It is reasonable to expect that prices will go up at least three percent a year. The present rate is greater than that, but the 46.4 percent increase since 1955 is exactly 3 percent, compounded. Three percent compounded for the 12-year period between now and 1980 is 43 percent. In plain language, this means that any State that now has a 7 cent gasoline tax would have to have a 10-cent rate by 1980 just to stay even with the cost of living index. Furthermore, the States will need to reexamine their registration fees to see whether they are realistic in terms of changing highway standards and costs. In many of the States it will be found that the registration fees have remained relatively rigid, and that they no longer cover the costs they once did. Ten dollars worth of registration fees on a 1940 basis buys only $4 worth of highway at today's prices, and will buy only $2.50 worth by 1980.

Whether we can ever achieve it, I don't know, but I do know that it would be to everybody's advantage to keep highway pricing, in the form of taxes, in line with the kind of a highway system we want. The brinkmanship and cliffhanging we have seen so often, the "hurry and catch up" that stop and go programs necessitate, really cost more in the long run.

In looking back to see whether I have properly arranged and expressed my thoughts, I am reminded of a sentence from the testimony of a high Government official, before a Congressional committee: "I know that you believe you understand what you think I said, but I'm not sure that you realize that what you heard is not what I meant."

To be sure, therefore, that I said what I meant to say, I'll try to sum it up: The public is willing to buy motor vehicles at current price levels, and it undoubtedly wants roads of matching quality, but doesn't understand the relationship of vehicle costs to road costs. The public does not realize what a relatively large proportion of his highway transportation dollar goes for the vehicle, and how little for the road. Furthermore, the road-user tax structure is on fixed units, gallons and vehicles. It lacks flexibility to move with values as other revenues do, so unless they are legislatively adjusted as prices increase, they lose purchasing power.

The future growth of highway transportation will depend to a considerable degree on whether there are roads for the vehicles. This in turn, will depend on the willingness of a better-informed public to see that its highway transportation dollars are wisely distributed between vehicles and roads. In this connection, I have been pleased to note the increasing restraint of industry in automatically opposing any proposed tax increase, any place, any time. There is a better understanding of the relationship of highway standards and costs, to those encountered by industry itself. This is a wholesome and welcome development, and it is working handsomely toward a better cooperative highway effort that will in the long run benefit the highway user most of all.

In closing, let me tell you of one lady who, when introduced to another, said, "Oh! So you're Ella Jones! I've heard so much about you! And I'd like to hear your side of the story."

And I thank you for listening to my side of the story.

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THE PRICING OF HIGHWAYS

Address by E. M. Cope, Chief, Highway Statistics Division
at the Western Association of State Highway
Officials Highway Planning Conference,
Scottsdale, Arizona, May 16-17, 1968

I am happy to be here again among this group of people—and among them are many old friends—who have had and will continue to have an important influence on the shaping and carrying out of the Nation's highway policy.

We have many problems to solve, and they involve a vastly more complex series of related transportation and social problems than we would have imagined even a short 10 years ago. But there is one problem that always stays with us. Money.

I have always thought that a considerable part of our money problem is our own fault. We have been so busy with the day-to-day problems of building and keeping up the highways that we have not prepared ourselves for rendering an understandable accounting to the public. We summarize highway systems and surfaces in thousands of miles, and speak fluently of highway costs in terms of millions of dollars. But I think we fail, too many times, to get any real understanding of the relationship between these figures and the individual road user's payments. We need to get down to the more understandable language of the pennies and dimes and dollars that are the charges, in the form of taxes, that the user pays for the support of highways. And we need to show how these charges fit in—what part they are—of the total cost the highway user must pay for the vehicle and the road to run it on. We need to tell it to the road user in language he understands.

When we choose an automobile, we pick the model and the features we want on it, and pay the going rate. When we upgrade the quality of the vehicle, or add power steering, radio, air conditioning, and other features, it goes into the price. In many respects, it's the same way with the road to drive the car on. When we surface a dirt road, or go from a 10-foot lane to a 12-foot lane, or upgrade the safety features of a road, or build a time-saving bypass, it goes into the price of the road. When labor and material costs in Detroit go up, the cost of cars goes up. When road wages and materials go up, the cost of building and maintaining roads goes up.

Under the user tax system, the same man buys both the car and the road. The features of the car are "priced out" for him. He knows how much he pays for an automatic transmission, power steering, radio,

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whitewalls, or any one of a dozen or so other features he can have on his car. But it has always seemed to me that the gasoline tax, of which he seems keenly aware, somehow appears to him to be a heavier burden than it really is. Perhaps this can be attributed to the fact that the features are optional, and the gasoline tax isn't. Anyhow, let's make some comparisons. The Arizona gasoline tax rate is 7 cents a gallon. (The National average of State gasoline tax rates is $6\frac{1}{2}$ cents a gallon, and the Federal gasoline tax is 4 cents a gallon.) An automatic transmission also costs about 7 cents a gallon. To explain this, the cost new is a little over $200, which is equal to about 3 cents per gallon for each of the 7,000 gallons the car will use in its 100,000-mile journey from the assembly line to the junkyard. To this 3 cents a gallon, we add the 4 cents a gallon that is the cost of the automatic transmission efficiency loss (about 12 percent, or approximately one-eighth of the 34 cents a gallon cost of gasoline). The customer pays the equivalent of 7 cents a gallon gasoline tax just to keep from shifting gears!

We are not accustomed to looking at vehicle costs this way, and they look strange to us, but there are many perfectly sound comparisons that can be made if we can adjust our thinking to the more flexible approach that we find in everyday use by the business world. An automobile air conditioner, with the tinted glass and heavy duty battery that go with it, costs about $420 just to buy it new. This is equal to 6 cents a gallon on every gallon of gasoline the car will use in its lifetime. Then if we make a very conservative estimate of the loss of only one mile per gallon for carrying the air conditioner's weight and operating it, we add another 2.4 cents a gallon, making a total of 8.4 cents a gallon for air conditioning.

In a report released in January 1968, the Bureau of Public Roads estimated the total 10-year cost of buying and operating an automobile at $11,024. If this total cost could somehow be collected entirely at the gasoline pump—that is, the cost of the car, gasoline, tires, repairs, parking, taxes and everything else that is included—gasoline would cost $1.57 a gallon. Of this, State and Federal taxes would account for 17 cents, and, in general, be used for highway construction, maintenance, and administration. In terms of cents per gallon, the remaining $1.40 would include 40 cents for depreciation, 25 cents for repairs and maintenance, another 25 cents for garaging, parking and tolls, 21 cents for gasoline, 20 cents for insurance, and smaller amounts for tires, accessories, and other costs.

However, the $1.57 covers only the basic car, with automatic transmission and radio. If we add power steering and power brakes, that's another 2 cents a gallon. Or for 2 cents a gallon you can add deluxe wheel covers and vinyl top. Bucket seats cost a little over a penny a gallon, and air conditioning about 8.4 cents. Whitewall tires are very reasonable—only a penny a gallon. You can easily compute these for your own car. If you have these features, you pay these prices, even though you may not have realized it before.

Let's take another quick look at tires. The extra cost of a set of white sidewall tires on a new car is a little over \$36. There will be 11 replacement tires during the life of the car, and at a premium of about \$3 each, another \$33. The total, about \$70, is just equal to 1 cent a gallon on all the gasoline the car will use in its lifetime. One cent a gallon would have increased by one third the amount of State funds Arizona had available for road construction in 1966.

There is another money problem that is overdue for examination. In 1940, the weighted average of the States' gasoline tax rates was 4.0 cents per gallon. Today, it is $6\frac{1}{2}$ cents. Offhand, that sounds like a pretty substantial increase, $62\frac{1}{2}$ percent. But the cost of living index is now 238 percent of the 1940 figure. On the basis of its 1940 cost-of-living purchasing power, the $6\frac{1}{2}$ cents is now worth 2.72 cents.

This reminds me a little of the lady who came home in the evening, and said to her husband as he looked up from the paper "I'll give you the good news first. Nobody was hurt in either car." Well, I gave you the good news first. The index of highway construction costs is now more than 275 percent of the 1940 figure. This means that a 6.5 cents a gallon gasoline tax today has the purchasing power that a 2.45 cents a gallon tax had in 1940. So the 6.5 cents gasoline tax of today buys only 61 percent as much highway construction as the 4.0 cents a gallon tax bought in 1940.

Let's take just one example of what has happened to prices. Cement hasn't increased in price nearly as much as many of the other elements of highway construction costs. Yet despite the increase in the gasoline tax rate, today it takes the tax from 18 gallons of gasoline to buy a bag of cement that could be bought with the tax from 14 gallons in 1940.

This whole problem of cost structure is further compounded by changes in highway standards. Considerations of safety, riding comfort, and speed, and the more recent stress on social factors—appearance, economic impact, noise, and public policy—have given us a whole new concept of what it takes to make an acceptable highway. These trends are good—they make for better, safer, more comfortable transportation. But they cost money. And we can't do as the Japanese track coach advised his runners, telling them how to beat the Americans—"Take longer steps, more frequently!"

Most of the other taxes we pay today are structured to fluctuate—and I'm being cautious, because I should say "go up"—as price levels fluctuate. The income tax, the sales tax, real estate taxes, all automatically follow price trends. But the gasoline tax is the backbone of highway finance, and a gallon of gasoline stays 231 cubic inches, no matter what happens to its price. The fact that highway revenue is almost entirely derived from fixed units, the gallon and the vehicle, with no ad valorem factor to adjust the yield to the prices of the marketplace almost condemns highway revenues to lag behind highway costs.

Man's reluctance to part with money has never been overcome, nor is it likely that it ever will be. Yet when we consider the truly vast amounts being spent for vehicles, it is only common sense to assume that the public is also willing to pay for roads that keep pace with the vehicles. The fact that we again and again engage in cliffhangers and brinkmanship in highway financing is probably the result, mainly, of our inability or failure to connect vehicle costs with highway costs to get the total picture of satisfactory highway transportation. The vehicle loses a lot of its usefulness and satisfaction unless there's a decent road to run it on. I've said it before, but it's worth repeating—a 10-year old Ford, on an up-to-date highway, gives better transportation than a brand new Cadillac on a congested, inadequate highway. We need to place vehicle costs in perspective with roadway costs. They go together.

The public can readily understand the facts if they are presented in simple understandable terms. Their attitude toward toll roads is a good case in point. To ride on major toll roads, the public pays charges that generally run about 1½ cents a mile. At 15 miles to the gallon, this costs the automobile owner an amount equal to a 22½ cents a gallon gasoline tax. And he pays it gladly, no questions asked. He knows what he is paying, and what he is buying—whether it be convenience or time saving and so on—and considers it worth the price.

Perhaps in the past some highway administrators have been reluctant to discuss matters they thought belonged more properly in the political and legislative arenas. More likely, though, it seems to me that sometimes we have simply lacked the inclination to concern ourselves with matters not directly concerned with the actual construction and maintenance of highways. Whatever the reasons, we are passing up many opportunities to obtain fuller understanding by the public of the relative costs of highways.

If you tell an automobile owner that the Arizona gasoline tax brings in $52 million a year, you are talking to him of a figure that has no everyday reality to him. But tell him his Arizona gasoline tax bill is 95 cents a week, and he understands. You are communicating. Or go for big figures, if you like. Tell him that it takes all of the Arizona road-user taxes for 325 automobiles for a whole year to buy one D-6 medium-size bulldozer.

I have discussed two matters so closely related that it is hard to determine where one ends and the other begins. In each instance, it is doubtful that the highway departments themselves have developed a full understanding of the problem. They need to make a real analysis of the relationship between vehicle costs, road costs, and general price levels, so that they themselves have the full perspective and picture. And the highway departments could borrow from industry in packaging the information. We tend to avoid telling a man that his road user tax bill is no more than his telephone bill. He is surprised to learn that a vinyl top on a car costs as much as 1 1/5 cents a gallon gasoline tax for the life of the car. How many Arizona automobile users have the faintest idea that bucket seats cost them more than would a 1-cent a gallon tax that would increase the State highway construction revenue by one-third? Would he believe that depreciation on a $2,800 car costs as much as a 40 cents a gallon gasoline tax would?

All of these things seem a little bit gimmicky to us. Maybe they are, but isn't it more likely that they sound strange simply because they are new? If we can adopt them, and use them to give the public a better understanding of the relationship between vehicle costs and road costs, we will go a long way toward solving the most persistent of all highway problems—money.