# DESIGNING THE 100 MPH EXPRESSWAY

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Highway transportation systems geared to sustained speeds of 100 mph are possible. You could be using them for intercity travel by the Year 2000. No technological breakthroughs are needed.

Here's how one such system might work. It is offered to provide a meaningful basis for a discussion of the larger social question: Do we want to build 100 mph highways?

The Century Expressway is one of seven interrelated concepts developed by CAL's Transportation Research Department. They're described in a 274-page report, "Metrotran 2000."

Design and construction of a 100-mile stretch of Century Expressway is recommended by CAL transportation specialists. It would serve as a national proving ground for auto travel at a steady 100 mph. Average highway speeds have been increasing year by year; it would seem wise to anticipate and solve the motorist's problems before they become unmanageable. The Century Expressway, if successful, could provide the basis for planning a national network of high-speed highways following the scheduled completion of the nation's Interstate System during the early 1970's.

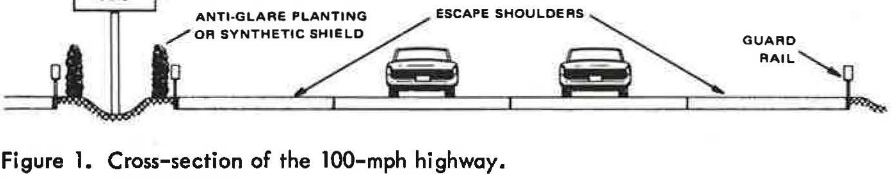


Figure 1. Cross-section of the 100-mph highway.

Century Expressway traffic would be limited to passenger cars meeting performance and safety standards. Only motorists holding special licenses would be permitted to enter. Trucks would be barred.

If the motorist does not own his own Century Cruiser (see Figure 4), he could rent one at the expressway's entrance terminal.

His car would have to pass a 90-second automatic inspection of critical safety items such as tires, brakes, steering, communication and signaling equipment. The driver then would pilot the car through a serpentine test section, climaxed by an unexpected stop, to determine his steering ability and reaction time. This would screen out drivers temporarily not competent as a result of drowsiness, drinking, illness or disturbed emotions.

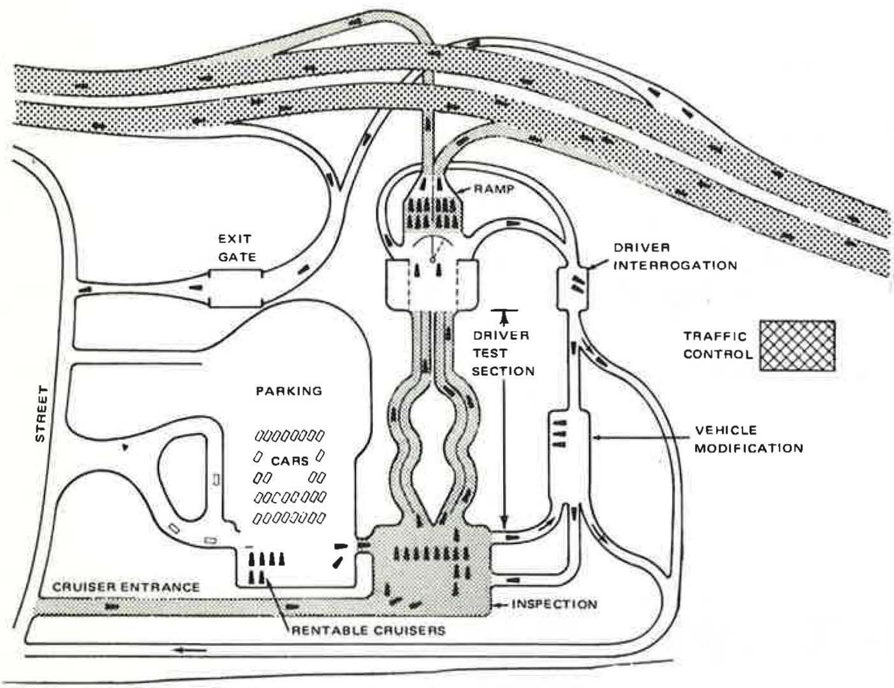


Figure 2. The Century Expressway interchange terminal.

A special merge-control system will direct cars into the high-speed traffic flow. The entering vehicle will wait at the beginning of the acceleration ramp. A computerized surveillance-and-control system will be watching main-stream traffic. Sufficiently far upstream of the acceleration ramp, the control system will actuate visual signals to particular drivers which will result in gaps in the traffic stream.

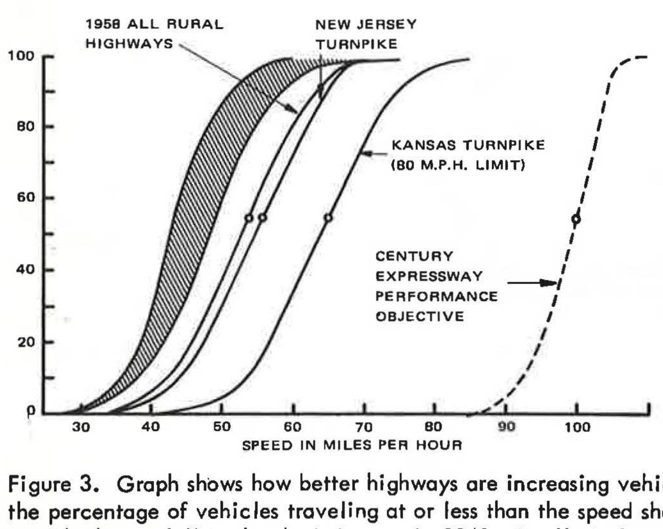


Figure 3. Graph shows how better highways are increasing vehicle speeds. The curves show the percentage of vehicles traveling at or less than the speed shown. Speeds on almost all rural highways fell in the shaded range in 1941. Small circles represent average speeds.

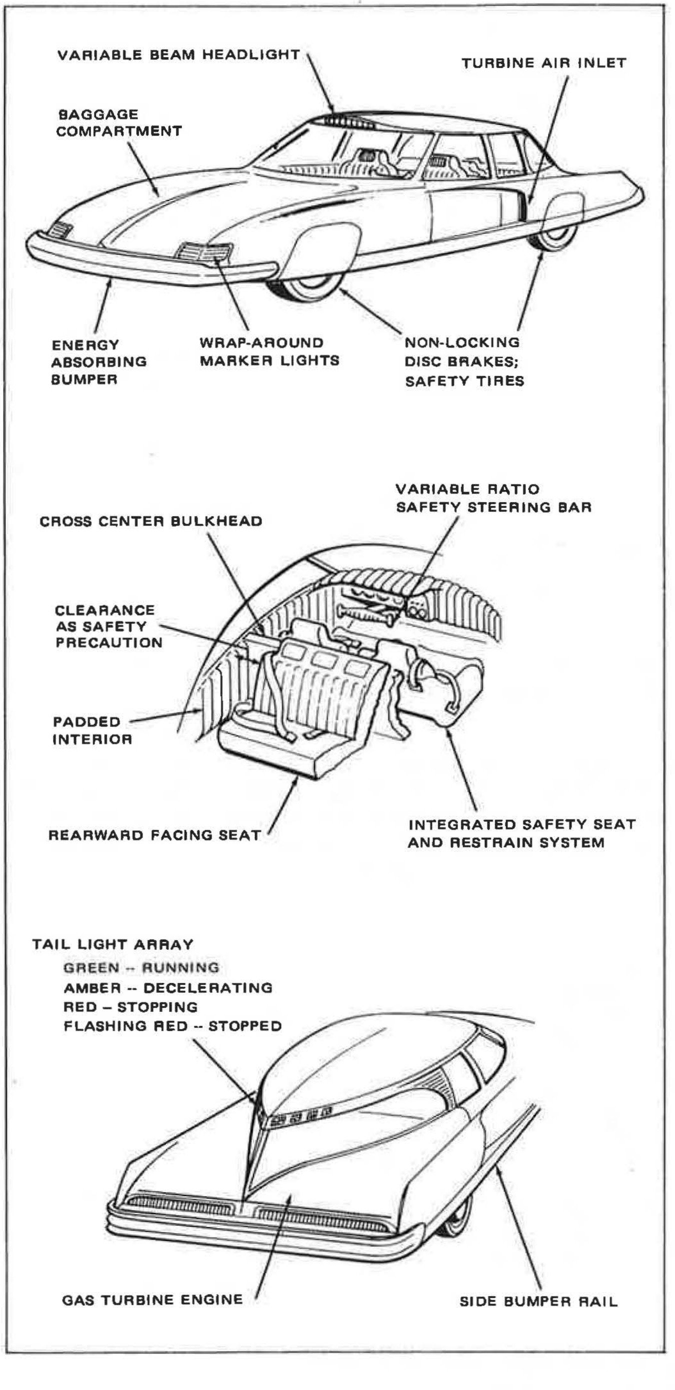


Figure 4. Details of the "Century Cruiser"—car of the future.

On a "Go Ahead" signal from the control system, the entering vehicle will start along the acceleration ramp. Sequenced "pacer" guide lights will aid the driver to maintain proper acceleration speed and position. The gap in the traffic stream should arrive just as he does, permitting safe and minimum-disturbance merging. If an adequate gap is not provided, a safety abort lane will allow a slower merge.

High-speed lanes would be 13 to 15 feet wide—slightly wider than U. S. Interstate standards. Each lane would have its own hard-surfaced emergency escape shoulder (see Fig. 1). Edging the shoulders would be guard rails scientifically designed to deflect cars along the shoulder rather than bounce them back into the traffic stream.

The capacity of each lane, at 100 mph, is estimated at 3, 000 cars per hour (keeping cars about 150 feet apart). This compares with capacity of about 2, 000 cars per hour, moving at 60 mph, for each lane of present-day expressways. Even further gains in capacity are possible if driving skills can be improved and intervehicle communication schemes made more effective.

## THE CAR

Driving the Century Expressways of the near future, you'll be officially characterized as a "straggler" if you cruise at anything slower than about 90 miles per hour. A patrol car, closing from behind, will probably order you through two-way radio to "Move it along!" or find yourself electronically ticketed for obstructing traffic.

Door to door, you'll be able to motor from San Francisco to Los Angeles in five to six hours, or from New York City to Washington in half that time.

Your Century Cruiser won't look too radically different. Some cars bearing a family resemblance are already on American highways. With curb weight of about 4, 500 pounds and 345-387 hp engine, the sedans can accelerate to 100 mph in 15 to 20 seconds.

But they're not yet designed for efficient crusing at 100 mph. Improvements are needed in durability and in handling qualities at high speed. Further, their slab sides and squarish corners create too much aerodynamic drag. At 100 mph their engines are burning more than a quart of gas per minute. It takes a big tank and a stout wallet to keep the speedometer needle at 100 mph when you're getting only five to six miles per gallon.

High-speed motoring could become a real pleasure, however, with the advent of the more advanced type of automobile visualized in the illustrations—the first passenger car fully designed for cruising at 100 mph. Curb weight could be reduced about 900 lb by use of lighter materials and by changing to a 250-horsepower gas turbine engine mounted in the rear.

Full streamlining could cut the car's drag coefficient (a measure of air resistance) from 0. 60 to 0. 35. The reduction in weight and drag would more than offset the reduction in engine horsepower. You'll accelerate to 100 mph in 13-18 seconds; top speed would be about 140 mph. The combination of advanced design and lower weight will make the cars more efficient to run—you'll get 24-26 miles per gallon at 50 mph, and 11-13 miles per gallon at cruising speed of 100 mph.

The car will be safer, too, and easier to control. Aerodynamics will play a more important role in providing stability and control at high speeds. For example, to help "hold down" or balance the vehicle, spoilers similar to those on airplane wings (and some racing cars) can be mounted front or rear; the trailing edges of the car body can be appropriately shaped to provide other desired control forces.

Headlights may be recessed in the front of the car roof to smooth streamlining, increase road visibility from the lamps, and reduce glare for oncoming cars. Similarly, the taillight array would be on the roof in back. To eliminate ambiguity, green rather than red would be used as a "running light."