

Commentary

Fix the Freeways Before Funding Trains

■ **Quake recovery:** Mobility, incomes and safety of residents depend much more on freeway retrofits than on a rail plan.

By JAMES E. MOORE II

The damage done to the Los Angeles road network by the Northridge earthquake raises a number of questions. Was the damage anticipated? If not, should it have been? Could it have been mitigated? Are the freeways safe?

Caltrans has been moving aggressively to retrofit its bridges. Work proposed by the agency's engineering personnel reveals a clear understanding of the importance of seismic retrofits which have been under way since the Sylmar earthquake in 1971. Initial efforts consisted of reinforcing bridges with restraining cables. By 1989, Caltrans had reinforced almost 1,300 bridges at a cost of only \$54 million.

The 1987 Whittier Narrows quake brought new problems, new lessons and new responses. These included an intensive research effort involving Caltrans, the University of California and California's private universities. The work focused on the seismic performance of single-column bridges. Findings permitted Caltrans to better respond to damage from the 1989 Loma Prieta quake in Northern California. In addition, the failure of Oakland's Nimitz freeway identified a new set of problems associated with multicolumn bridges, particularly bridges of irregular design.

Caltrans' research paid off in other ways, too: By 1989, engineers in the Department of Transportation and in California universities had acquired a new understanding of the seismic risks carried by the system. Caltrans moved quickly to formulate plans and propose budgets.

This is exactly the sort of objective, systematic decision-making we expect of our public agencies. However, once these proposals leave Caltrans, trade-offs between resources allocated to seismic retrofits and resources dedicated to competing forms of transportation become a political question; science takes a back seat.

Disasters like the Sylmar, Whittier Narrows, Loma Prieta and Northridge quakes open narrow windows of opportunity for public authority to set aside politics and focus public resources for the greatest benefit for the greatest number of people. In 1989, the California Transportation

Commission seized the opportunity presented by the Loma Prieta quake and responded to Caltrans' persistent proposals that the retrofit program be substantially accelerated.

Los Angeles' experience presents another such window in 1994. The state's annual budget for seismic retrofits is a modest \$1.5 billion. Caltrans has made the most of these resources and Los Angeles has benefited greatly. In Los Angeles' Caltrans District 7 alone, 302 hinge bridges, 117 single-column bridges and five multicolumn bridges have been fully retrofitted. All of these held up during the Jan. 17 quake. All of the network's major failures involved unreinforced structures. All but one of these, a section along Highway 118, were scheduled for reinforcement.

The failed span not scheduled for further work was very close to the epicenter of last week's quake. Because the quake occurred along an unmapped fault, this suggests that we are unlikely ever to have enough information to prevent the sort of failure that occurred at the 118 and I-5 interchange.

To protect the transportation system completely from earthquake risks would require not only engineering talent, fiscal resources and political will, but complete knowledge of earthquake faults. The weak link in our armor is our knowledge of the seismic map.

Because resources are scarce, Caltrans must prioritize retrofit projects. It is a straightforward matter for the department to account for traffic conditions, age of the structure being considered for retrofit and the structure's design characteristics. Proximity to an active fault remains the

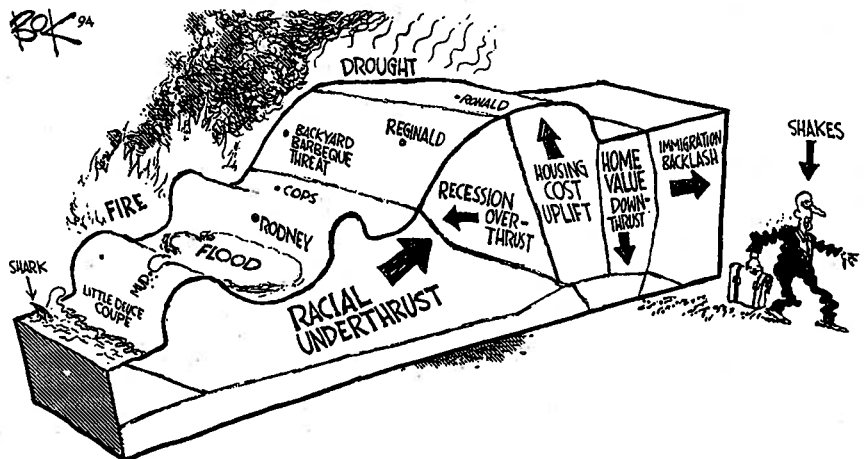
wild card.

So long as knowledge of the fault system remains incomplete, as is the likely case, large earthquakes are going to produce some structural failures in the transportation system. Caltrans District 7 manages about 1,500 bridges in one of the most seismically active regions of the world. Even if Caltrans made every retrofit that its surveys called for, occasional failures are a statistical certainty.

If these facts make us uncomfortable, then we have two obvious options. We can move, or we can use local resources to accelerate the local component of the state's highway retrofit program. The current budget for the Los Angeles County Metropolitan Transportation Authority's 30-year integrated transportation plan is about \$160 billion. The lion's share is dedicated to rail projects, with the remainder for highways, buses and transportation-demand management. None of this money is currently available for retrofitting of highway structures.

The mobility, incomes and safety of Los Angeles residents depend much more heavily on a successful highway retrofit program than on the Los Angeles rail plan. We need to put first things first. Local authorities should line up behind Caltrans and shore up the freeways before expanding train service. We have received the clearest sort of evidence that this shift in priorities is necessary. The next reminder may not be as relatively gentle as the Northridge quake.

James E. Moore II is an associate professor of urban and regional planning and of civil engineering at USC.



Los Angeles Fault lines.

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