DISCUSSION

THE LOMA PRIETA, CALIFORNIA, EARTHQUAKE OF
OCTOBER 17, 1989: REPORT OF THE NZNSEE
RECONNAISSANCE TEAM

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J H GATES¹:

I read with great interest the article by
the New Zealand Reconnaissance Team. The
Team should be congratulated on a job well
done. I have read several summary reports
and this one is not only one of the best, it
presents the material in a very interesting
manner. I think the engineering community is
very fortunate that your Team was in the Bay
Area at the time of the earthquake. Many
times as we investigate an event of this
magnitude, we are so close to the scene that
we often miss some of the more subtle
aspects and lessons that result. Your Team,
with their independent view have given us
that good overall view. Of course, when
gathering such a large amount of data,
certain inaccuracies are bound to show up
and it is in a spirit of completeness and
not of criticism that I offer the following
corrections to the factual material relating
to bridges which was gathered by your team.

EDITORIAL (piii)

The Cypress section of I-880 was NOT
officially in line for retro-fit - only
single column structures were actually being
put into projects. All remaining bridges
(including Cypress) would have been included
in the next retrofit phase. Similar bridges
in San Francisco had just been identified
(but not yet put into a project) and I am
positive that Cypress, once identified would
have been assigned a high priority.

When the BARTD crossing was designed, their
designs were subjected to intensive review -
including seismic. I am sure that if the Bay
Bridge had been involved, it's seismic
response would have received close scrutiny.

8.2 BRIDGES - GENERAL PERFORMANCE (p52)

California bridges built after about 1973
performed very well. The major damage
occurred to earlier designs which were built
before modern standards. The single
significant damage to a modern bridge was to
an outrigger which can be attributed to a
lack of adequate detailing of the knee
joint.

8.3 I-280 EXTENSION (p52)

This portion of the China Basin facility
(I-280 extension) was constructed BEFORE 1971
and therefore contained several non-ductile
details. The poor performance of knee joints
can be attributed primarily to details and
improved details have already been
developed. Additional testing is being
planned to validate these details.

8.5 I-880 CYPRESS (p52)

Refer to my discussion (above) on retrofit
scheduling of Cypress.

8.7 MOCOCO RAMP (p58)

The abutment of this structure is located on
very soft material and has experienced
problems with lateral spread movements for
several years. The earthquake just
emphasised this problem.

8.8 STRUVE SLOUGH (p58)

Investigations by Caltrans and others have
determined that the bridge superstructure
itself was not significantly excited by the
earthquake. It appears that the very soft
slough soils moved a great deal but the
piles broke off before transmitting any
significant load to the superstructure. No
evidence of hinge banging or abutment
movement was found.

8.9 MADRONE DRIVE OVERHEAD (p59)

The only bridge in the Bay area which has
been retrofit with lead/rubber isolation
bearings is the Sierra Point bridge south of
San Francisco. The Madrone Drive
Undercrossing on Route 17 (Br.No. 37-59) is
a three span T-beam with simply supported
end spans built in 1937. The girders are
supported on 6 inch high rocker bearings at
the abutments. Excessive abutment
settlements at the bridge necessitated that
the bridge be jacked and shimmed in 1943.

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Seismic retrofit of this bridge in 1983 consisted of the addition of cable restrainers at the intermediate hinges plus the addition of concrete catcher blocks and transverse keys at the abutments to provide lateral restraint and support in the event of rocker bearing failure.

8.14 CONCLUSION (p64)

Phase II retrofit contracts are currently underway - initial contracts are located primarily in the Los Angeles basin and the San Francisco Bay area. I do not know where the press got the information on costs to retrofit Cypress, as it was never identified or estimated. I think that there was some confusion on the part of the press with some of the approach structures to the Bay Bridge (located on Route 880) which had been identified and estimated as requiring retrofit. (Refer also to my earlier comments on Cypress).

Again, my congratulations to your Team on a job well done. It is my hope that copies of the Reconnaissance Team Report will be given wide distribution here in the U.S.