INFORMATION HANDOUT

For Contract No. 04-0G7104
At 04-SM-280-R21.3

Identified by
Project ID 0400001988

MATERIALS INFORMATION

Final Seismic Design Recommendations, dated May 28, 2013

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. BRIAN MORI
Senior Bridge Engineer
Division of Engineering Services
Office of Bridge Design-West
Bridge Design Branch 8

Attention: Mr. Sameh Hegazi

Date: May 28, 2013

File: 04-SM-280-PM 21.3
04-0G7101
Sneath Lane OC
Bridge No. 35-0225

From: HOSSAIN SALIMI
Senior Materials and Research Engineer
Division of Engineering Services
Geotechnical Services – MS-5
Office of Geotechnical Design-West

Subject: Final Seismic Design Recommendations

This memorandum is in response to your latest request dated May 2, 2013 to provide the Final Seismic Design Recommendations (FSDR) for the proposed seismic retrofit of the existing 4-span Sneath Lane Overcrossing (Bridge No. 35-0225) on Route 280 in the City of San Bruno. The available documents indicate that the structure was designed in 1968 and built in 1971. It should also be noted that the Preliminary Seismic Design Recommendation (PSDR) was submitted to Mr. Sameh Hegazi in a report dated March 8, 2010 (please see attached).

Based on the minutes from the Strategy Meeting which took place on May 9th, the retrofit strategy includes the use of steel casings on existing columns from soffit down to the pile cutoffs. There will be no subsurface/geotechnical work associated with the seismic retrofit. The findings as outlined in the PSDR are valid and considered final. As previously mentioned in the PSDR, liquefaction potential due to the nature of materials encountered and lack of ground water table is considered minimal. If there are any questions, please contact Hossain Salimi at (916) 227-7147.

Attachments

c: TPokrywka (OGD-W)
MMacaranes (OGD-W)
CChen (OGD-W)
MMomenzadeh (OGD-W)

REGISTERED PROFESSIONAL ENGINEER
HOSSAIN SALIMI
No. 54367
Exp. 12/2013
CIVIL
STATE OF CALIFORNIA

Memorandum

Flex your power!
Be energy efficient!

To: MR. GARY JOE
Senior Bridge Engineer
Division of Engineering Services
Office of Bridge Design-West
Bridge Design Branch 13

Attention: Mr. Sameh Hegazi

Date: March 8, 2010

File: 04-SM-280-PM 21.3
04-0G710K
Sneath Lane OC
Bridge No. 35-0225

From: HOSSAIN SALIMI
Senior Materials and Research Engineer
Division of Engineering Services
Geotechnical Services – MS-5
Office of Geotechnical Design-West

Subject: Preliminary Seismic Design Recommendations

This memorandum is in response to your request dated February 26, 2010 to provide the Preliminary Seismic Design Recommendations (PSDR) for the proposed seismic retrofit of the existing 4-span Sneath Lane Overcrossing (Bridge No. 35-0225) on Route 280 in the City of San Bruno. The available documents indicate that the structure was built in 1971.

According to the new 2008 California Seismic Hazard Map (CSHM), which is based on the United States Geological Survey (USGS) and California Geological Survey (CGS) maps, the San Andreas Fault Zone (Peninsula section) with a Maximum Magnitude Mmax=7.9 is located less than 1.5 kilometers southwest of the site.

The available geotechnical data includes the As-Built Log-of-Test-Borings (LOTB) from 1972. There are two mud rotary borings, B-1 and B-3, drilled to a maximum depth of 56, and 52 feet, respectively, as well as three Cone Penetrometer Test (CPT) holes drilled to a maximum depth of 40 feet. Based on the two mud rotary borings drilled in 1965, the geology at the site consist of about 10 feet of slightly compact clayey silty sand underlain

by dense to very dense medium to coarse sand and gravelly sand. Based on this data, the site is categorized as having a Vs30 = 300 meters per second (m/s) which is equivalent to type D soil profile.

According to the As-Built LOTBs, ground water was not encountered during the aforementioned field investigation. Due to lack of water table and the nature of material(s) encountered, the potential for soil liquefaction during a seismic event is minimal. However, the potential can not be fully analyzed and/or determined at this time.

The Acceleration Response Spectrum (ARS) curves based on both the new Caltrans On-Line Deterministic Seismic Hazard Analysis (DSHA) and Probabilistic Seismic Hazard Analysis (PSHA) using a 975-year return period (5% probability of exceedance in 50 years) were generated for the site, incorporating the latest Attenuation Relationship models. In addition, the PSHA with a 975-year return period using the USGS Interactive Deaggregation procedure was generated, and all three curves were compared. Due to the high seismicity of the site, the PSHA response spectra were both higher than the deterministic spectrum (please see Figure 1).

Furthermore, the spectrum generated using the USGS Interactive Deaggregation procedure yielded higher amplitudes at all periods and thus chosen as the recommended preliminary ARS curve (please see Figure 2).

Please note that the preliminary ARS curve has been modified to account for the proximity of the site to the fault. The modifications are such that there is no increase in spectral acceleration in periods less than 0.5 seconds and a 20% increase for periods greater than one second. A linear interpolation was used between 0.5 and one second.

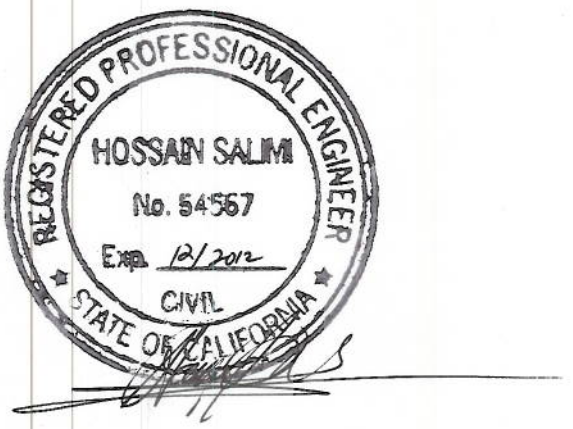
It is recommended that a site investigation to include exploratory borings with Standard Penetration Test (SPT), measurement of the ground water table, and the collection of samples for subsequent laboratory gradation analysis, plasticity index, shear tests, etc. be conducted.

I will keep you informed on any potential changes as updates and changes become finalized, and re-examine these recommendations once the field investigation is completed. The Final Seismic Design Recommendations will be submitted once the field investigation is completed and the project gets to the final design phase.

If there are any questions, please contact Hossain Salimi at (916) 227-7147.

Attachments

c: TPokrywka (OGD-W)
MMacaranes (OGD-W)
GS File room
District Project Manager
District Environmental Planning
GS Corporate
District Materials Engineer
Structure Construction R.E Pending File



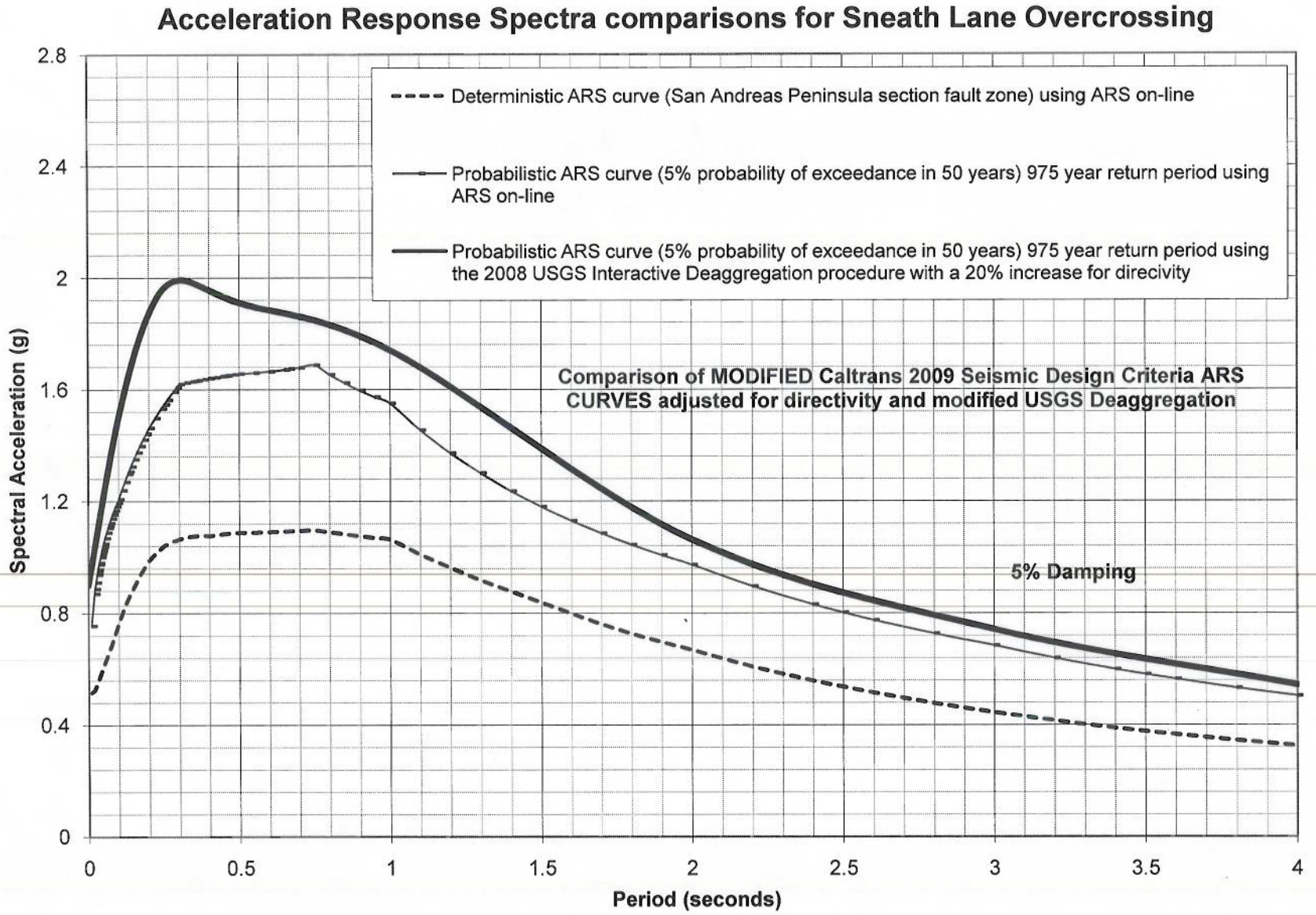

Acceleration Response Spectra comparisons for Sneath Lane Overcrossing
Deterministic ARS curve (San Andreas Peninsula section fault zone) using ARS on-line
Probabilistic ARS curve (5% probability of exceedance in 50 years) 975 year return period using ARS on-line
Probabilistic ARS curve (5% probability of exceedance in 50 years) 975 year return period using the 2008 USGS Interactive Deaggregation procedure with a 20% increase for direcivity
Comparison of MODIFIED Caltrans 2009 Seismic Design Criteria ARS CURVES adjusted for directivity and modified USGS Deaggregation
5% Damping
Spectral Acceleration (g)
Period (seconds)
2.8
2.4
2
1.6
1.2
0.8
0.4
0
0
0.5
1
1.5
2
2.5
3
3.5
4

Figure 1

04-SM-280
04-0G710K
Bridge No. 35-0225

Recommended Preliminary Acceleration Response Spectrum for Sneath Avenue Overcrossing

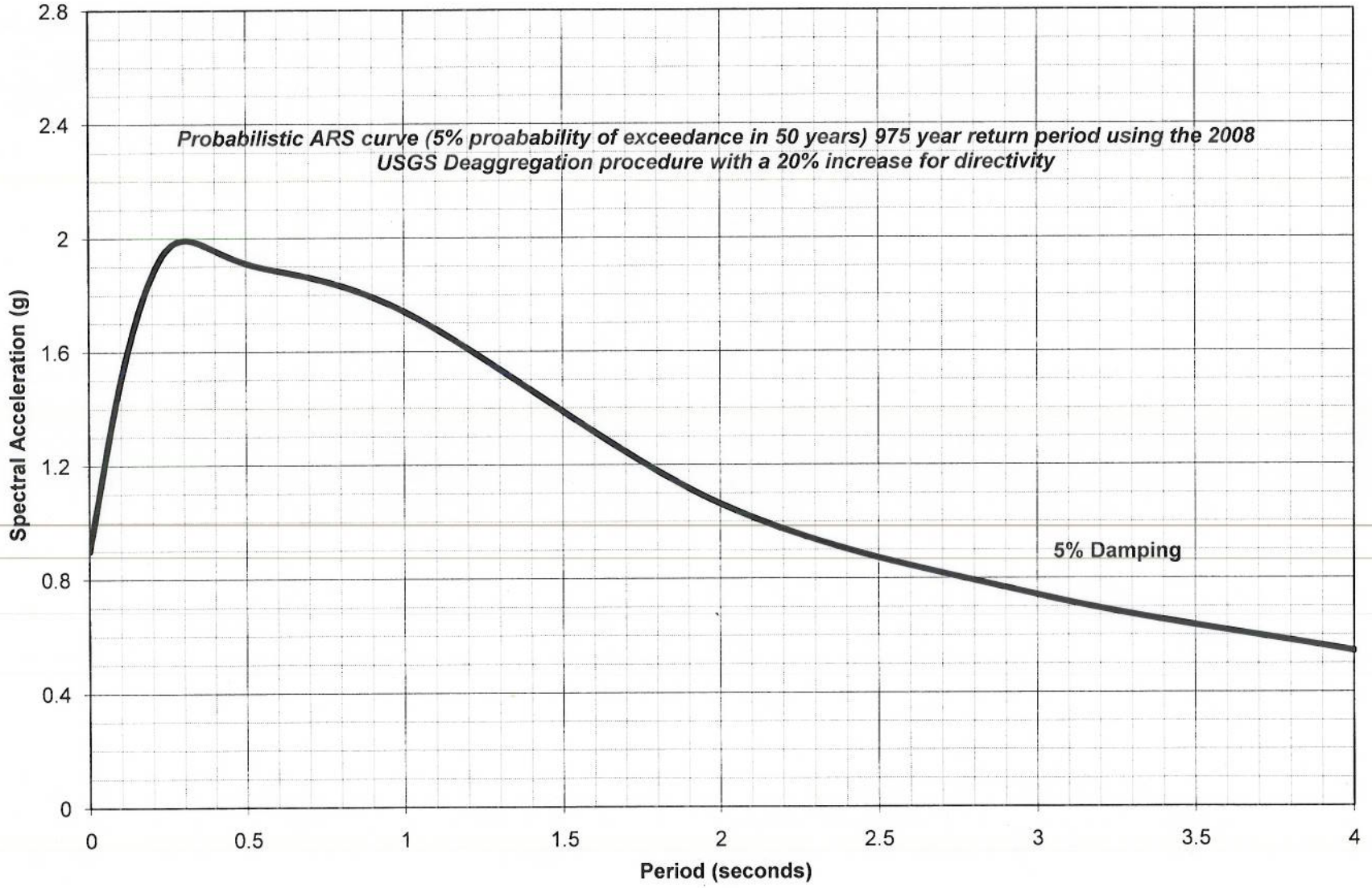


Figure 2