

*California Department of Transportation  
Division of Maintenance*

***Structure Maintenance and Investigations***

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**B**<sub>RIDGE</sub>

**I**<sub>NSPECTION</sub>

**R**<sub>ECORDS</sub>

**I**<sub>NFORMATION</sub>

**S**<sub>YSTEM</sub>

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**DEPARTMENT OF TRANSPORTATION**  
Structure Maintenance & Investigations

**Bridge Number** : 55C0400  
**Facility Carried**: EDINGER AVE  
**Location** : 1.7 MI W/O BOLSA CHICA R  
**City** :  
**Inspection Date** : 02/10/2011

**Bridge Inspection Report**

**Inspection Type**  
Routine ☐ FC ☐ Underwater ☐ Special ☐ Other ☒ Follow Up

**STRUCTURE NAME**: BOLSA CHICA CHANNEL

**CONSTRUCTION INFORMATION**

Year Built : 1968 Skew (degrees): 50  
Year Widened: 1988 No. of Joints : 0  
Length (m) : 92.4 No. of Hinges : 0

Structure Description: Simply supported 15-span timber stringers (17 each) and a corrugated steel plate deck (Armco 12 gage) with 10-timber pile bents and 10-timber pile at west abutment and 11-timber pile at east abutment with timber sheathing walls.

Span Configuration : (W) 15 @ 6.1 m (E) c/c

**LOAD CAPACITY AND RATINGS**

Design Live Load: OTHER OR UNKNOWN

Inventory Rating: 23 metric tonnes

Calculation Method: LD & RES FAC (LRFR)

Operating Rating: 36 metric tonnes

Calculation Method: LD & RES FAC (LRFR)

Permit Rating : XXXXX

Posting Load : Type 3: Legal

Type 3S2: Legal

Type 3-3: Legal

**DESCRIPTION ON STRUCTURE**

Deck X-Section: (N) 0.4 m br, 7.5 m, 1.3 m sw, 0.3 m br (S).

Total Width: 9.0 m

Net Width: 4.5 m

No. of Lanes: 1

Rail Description: MBBR

Rail Code : 0000

Min. Vertical Clearance: Unimpaired

**DESCRIPTION UNDER STRUCTURE**

Channel Description: Earth trapezoidal tidal channel with a rock slope at the westerly bank.

**CONDITION TEXT**

**REVISIONS**

(Pile)

The element # 206 was modified 30 piles from state 1 to state 4 to reflect the current condition.

(Pile Cap)

The element # 235 was modified 37 m of bent cap from state 1 to state 4 to reflect the current condition.

The inventory rating was modified from 20.7 metric tonnes to 23.1 metric tonnes.

The operating rating was modified from 28.8 metric tonnes to 35.9 metric tonnes.

All legal truck loads are permissible in one way traffic only.

The permit rating was modified from PPPPP to XXXXX.

**CONDITION OF STRUCTURE**

This is follow up the report base of the report of AECOM Transportation on behave of County of Orange dated May 10, 2010 and revised on January 13, 2011. The report was reviewed by the Underwater Investigation Senior Mr. Hunt and the Bridge Rating and Analysis Branch Senior Mr. Huang, and they concurred with the County report.

The load rating calculation result of two options:

First option is to reduce the load limit to:

7 TON PER VEHICLE

**CONDITION TEXT**

11 TON PER SEMI-TRAILER COMBINATION  
 14 TON PER FULL TRUCK AND FULL TRAILER

The second option is to reduce the traffic lane to one lane for both directions.  
 After communication with Mr. Hoisington Senior Engineer/Bridge Section in Orange County  
 the second option was expected.  
 The revision of the bridge inspection report was base on that decision.

**UNDERWATER INVESTIGATION**

The piles at Bents 12 through 14 are in poor condition. The inspection indicates pile section loss greater than 50 percent is severe condition at; three locations at Bent 12, six locations at Bent 13, and six locations at Bent 14; also it indicates pile section loss between 25-50 percent is major condition at; six locations at Bent 12, four locations at Bent 13, and three locations at Bent 14. Other locations show significant pile degradation due to borer activity.

**Safe Load Capacity**

The safe load-carrying capacity of this structure is for one lane open for traffic which is legal for the three type of legal truck (Type 3, Type 3S2, and Type 3-3) and no permit load.

The governing location: Bent 13 pile B govern base on embedment.

**MISCELLANEOUS**

As a consequence of these revisions, the calculated Sufficiency Rating is 31.6 and since the bridge is also "Structurally Deficient", it may qualify to be in the list for replacement within the Highway Bridge Rehabilitation and Replacement Program.

**RECOMMENDATIONS**

The County of Orange is recommended to follow the two options the second option which is to limit the road for one lane traffic for two ways directions.

**ELEMENT INSPECTION RATINGS**

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State				
					St. 1	St. 2	St. 3	St. 4	St. 5
30	Steel Deck - Corrugated/Orthotropic/Etc.	3	693	sq.m.	693	0	0	0	0
111	Timber Open Girder/Beam	3	1570	m.	1564	6	0	0	
206	Timber Column or Pile Extension	4	161	ea.	131	0	0	30	
216	Timber Abutment	4	28	m.	28	0	0	0	0
235	Timber Cap	3	199	m.	162	0	0	37	
256	Slope Protection	3	1	ea.	1	0	0	0	0
337	Metal Railing (W6X25 Posts)	3	204	m.	0	204	0	0	0

**WORK RECOMMENDATIONS**

RecDate: 02/10/2011  
 Action : Bridge-Misc  
 Work By: LOCAL AGENCY  
 Status : PROPOSED

EstCost:  
 StrTarget: EMERGENCY  
 DistTarget:  
 EA:

Reduce the traffic way to one lane two directions to avoid posting the structure for load limit.

WORK RECOMMENDATIONS

RecDate: 02/10/2011

Action : Sub-Replace

Work By: LOCAL AGENCY

Status : PROPOSED

EstCost:

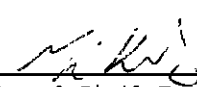
StrTarget: 1 YEAR

DistTarget:

EA:

Replace all damaged and deteriorated piles as being indicated by AECOM report dated 1/13/2011 to restore the safe load capacity. As a consequence of these revisions, the calculated Sufficiency Rating is 31.6 and since the bridge is also "Structurally Deficient", it may qualify to be in the list for replacement within the Highway Bridge Rehabilitation and Replacement Program.

Inspected By : MT.Zaarour

  
Mikhael T. Zaarour (Registered Civil Engineer)

# **STRUCTURE INVENTORY AND APPRAISAL REPORT**

## \*\*\*\*\* IDENTIFICATION \*\*\*\*\*

(1) STATE NAME- CALIFORNIA 069  
 (8) STRUCTURE NUMBER 55C0400  
 (5) INVENTORY ROUTE (ON/UNDER) - ON 150000000  
 (2) HIGHWAY AGENCY DISTRICT 12  
 (3) COUNTY CODE 059 (4) PLACE CODE 00000  
 (6) FEATURE INTERSECTED- BOLSA CHICA CHANNEL  
 (7) FACILITY CARRIED- EDINGER AVE  
 (9) LOCATION- 1.7 MI W/O BOLSA CHICA RD  
 (11) MILEPOINT/KILOMETERPOINT 0  
 (12) BASE HIGHWAY NETWORK- NOT ON NET 0  
 (13) LRS INVENTORY ROUTE & SUBROUTE  
 (16) LATITUDE 33 DEG 43 MIN 48 SEC  
 (17) LONGITUDE 118 DEG 04 MIN 12 SEC  
 (98) BORDER BRIDGE STATE CODE % SHARE %  
 (99) BORDER BRIDGE STRUCTURE NUMBER

## \*\*\*\*\* STRUCTURE TYPE AND MATERIAL \*\*\*\*\*

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER  
 TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702  
 (44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA  
 TYPE- OTHER/NA CODE 000  
 (45) NUMBER OF SPANS IN MAIN UNIT 15  
 (46) NUMBER OF APPROACH SPANS 0  
 (107) DECK STRUCTURE TYPE- CORRUGATED STEEL CODE 6  
 (108) WEARING SURFACE / PROTECTIVE SYSTEM:  
 A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6  
 B) TYPE OF MEMBRANE- NONE CODE 0  
 C) TYPE OF DECK PROTECTION- NONE CODE 0

## \*\*\*\*\* AGE AND SERVICE \*\*\*\*\*

(27) YEAR BUILT 1968  
 (106) YEAR RECONSTRUCTED 1988  
 (42) TYPE OF SERVICE: ON- HIGHWAY 1  
 UNDER- WATERWAY 5  
 (28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00  
 (29) AVERAGE DAILY TRAFFIC 1529  
 (30) YEAR OF ADT 2007 (109) TRUCK ADT 3 %  
 (19) BYPASS, DETOUR LENGTH 199 KM

## \*\*\*\*\* GEOMETRIC DATA \*\*\*\*\*

(48) LENGTH OF MAXIMUM SPAN 6.1 M  
 (49) STRUCTURE LENGTH 92.4 M  
 (50) CURB OR SIDEWALK: LEFT 0.3 M RIGHT 1.2 M  
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 4.5 M  
 (52) DECK WIDTH OUT TO OUT 9.0 M  
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 12.8 M  
 (33) BRIDGE MEDIAN- NO MEDIAN 0  
 (34) SKEW 50 DEG (35) STRUCTURE FLARED NO  
 (10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M  
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 4.5 M  
 (53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M  
 (54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M  
 (55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M  
 (56) MIN LAT UNDERCLEAR LT 0.0 M

## \*\*\*\*\* NAVIGATION DATA \*\*\*\*\*

(38) NAVIGATION CONTROL- NOT APPLICABLE CODE N  
 (111) PIER PROTECTION- CODE  
 (39) NAVIGATION VERTICAL CLEARANCE 0.0 M  
 (116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M  
 (40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

## \*\*\*\*\* SUFFICIENCY RATING = 27.6 \*\*\*\*\*

STATUS STRUCTURALLY DEFICIENT

HEALTH INDEX 97.7

PAINT CONDITION INDEX = N/A

## \*\*\*\*\* CLASSIFICATION \*\*\*\*\* CODE

(112) NBIS BRIDGE LENGTH- YES Y  
 (104) HIGHWAY SYSTEM- NOT ON NHS 0  
 (26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16  
 (100) DEFENSE HIGHWAY- NOT STRAHNET 0  
 (101) PARALLEL STRUCTURE- NONE EXISTS N  
 (102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3  
 (103) TEMPORARY STRUCTURE-  
 (105) FED.LANDS HWY- NOT APPLICABLE 0  
 (110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0  
 (20) TOLL- ON FREE ROAD 3  
 (21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

## \*\*\*\*\* CONDITION \*\*\*\*\* CODE

(58) DECK 7  
 (59) SUPERSTRUCTURE 7  
 (60) SUBSTRUCTURE 4  
 (61) CHANNEL & CHANNEL PROTECTION 7  
 (62) CULVERTS N

## \*\*\*\*\* LOAD RATING AND POSTING \*\*\*\*\* CODE

(31) DESIGN LOAD- OTHER OR UNKNOWN 0  
 (63) OPERATING RATING METHOD- LD & RES FAC (LRFR) 3  
 (64) OPERATING RATING- 36  
 (65) INVENTORY RATING METHOD- LD & RES FAC (LRFR) 3  
 (66) INVENTORY RATING- 23  
 (70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5  
 (41) STRUCTURE OPEN, POSTED OR CLOSED- A  
 DESCRIPTION- OPEN, NO RESTRICTION

## \*\*\*\*\* APPRAISAL \*\*\*\*\* CODE

(67) STRUCTURAL EVALUATION 4  
 (68) DECK GEOMETRY 2  
 (69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N  
 (71) WATER ADEQUACY 4  
 (72) APPROACH ROADWAY ALIGNMENT 6  
 (36) TRAFFIC SAFETY FEATURES 0000  
 (113) SCOUR CRITICAL BRIDGES 5

## \*\*\*\*\* PROPOSED IMPROVEMENTS \*\*\*\*\*

(75) TYPE OF WORK- CODE  
 (76) LENGTH OF STRUCTURE IMPROVEMENT M  
 (94) BRIDGE IMPROVEMENT COST \$359,480  
 (95) ROADWAY IMPROVEMENT COST \$71,896  
 (96) TOTAL PROJECT COST  
 (97) YEAR OF IMPROVEMENT COST ESTIMATE 2009  
 (114) FUTURE ADT 2606  
 (115) YEAR OF FUTURE ADT 2028

## \*\*\*\*\* INSPECTIONS \*\*\*\*\*

(90) INSPECTION DATE 05/09 (91) FREQUENCY 12 MO  
 (92) CRITICAL FEATURE INSPECTION: (93) CFI DATE  
 A) FRACTURE CRIT DETAIL- NO MO A)  
 B) UNDERWATER INSP- YES 60 MO B) 04/07  
 C) OTHER SPECIAL INSP- NO MO C)



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## Memorandum

To	Rich Hoisington	Pages	2
CC	Mohan Char		
Subject	Load Rating, Edinger Bridge Over Bolsa Chica Channel (CO2)		
		Project No : 60180354-60132137	
From	Robert Price		
Date	January 13, 2011		

We have performed a load rating evaluation and an in-house QC on the calculations and the following is a summary of the results.

### With 2 lanes open:

First Failure of Pile "I" Bent 12	
Inventory Rating	Operating Rating
<b>8.1 tons</b>	<b>17.3 tons</b>

Governing location: Bent 12, Pile I

General Bent Strength		
<u>Inventory Rating</u> (Based on HS20, 3 axle GVW=36 tons)	Based on H20, two axle GVW	<u>Operating Rating</u>
<b>18.1 tons</b>	<b>11.4 tons</b>	<b>28.2 tons</b>

Governing location Bent 12, Pile H based on embedment capacity

### With 1 lane open (closed eastbound lanes, westbound lanes open):

General Bent Strength		
<u>Inventory Rating</u> (Based on HS20, 3 axle GVW)	Based on H20, two axle GVW	<u>Operating Rating</u>
<b>23.1 tons</b>	<b>17.4 tons</b>	<b>35.9 tons</b>
Governing Location: Bent 13, Pile E governs based on embedment	Governing Location: Bent 13, Pile B governs based on embedment	Governing Location: Bent 13, Pile E governs based on embedment



### Load Rating with AASHTO Legal Load Vehicles

Since the Inventory Rating is lower than the gross vehicle weight, the legal loading requirements for posting were evaluated. The results are as follows:

#### With 2 lanes open:

General Bent Strength		
Type 3, GVW = 25 tons	Type 3S2, GVW = 36 tons	Type 3-3, GVW = 40 tons
<b>7.3 tons</b>	<b>11.2 tons</b>	<b>14.2 tons</b>

Permit Rating Factor = 0.78, Bent Cap is the controlling location.

#### With 1 lane open (closed eastbound lanes, westbound lanes open):

General Bent Strength		
Type 3, GVW = 25 tons	Type 3S2, GVW = 36 tons	Type 3-3, GVW = 40 tons
<b>25.2 tons</b>	<b>38.8 tons</b>	<b>49.2 tons</b>

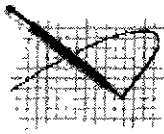
Governing Location: Bent 13, Pile B

Permit Rating Factor = 0.91, Controlling location is Bent 13 Pile E.

Bent Cap without Pile "I" load ratings do not control.

**With closure of eastbound lanes, the load ratings for AASHTO Legal Loading exceeds GVW on structure portions carrying the one lane, therefore no posting is required.**

The calculations dated, January 13, 2011, are attached as a separate document.



**Kenneth  
Vo/D12/Caltrans/CAGov**

02/07/2011 02:13 PM

To Mikhael T Zaarour/HQ/Caltrans/CAGov@DOT

cc Gedion Werrede/HQ/Caltrans/CAGov@DOT, Bing  
Wu/HQ/Caltrans/CAGov@DOT, George  
Huang/HQ/Caltrans/CAGov@DOT

bcc

Subject RE: Edinger Bridge 55C0400 - Load Rating for Posting

Hi Mikhael,

The latest revision of the calculations has addressed my comments and I have no further question at this point in time. As previously agreed by George Huang, we respect the analysis results performed by the Consultant. The Legal Postings are summarized as below:

With 2 Lanes Open Option:

Type-3: 7.3 tons

Type3-S2: 11.2 tons

Type3-3: 14.2 tons

With 1 Lane Open Option:

No Posting Required

Permit Rating shall be: XXXXX

Please let me know if you have any other question.

Regards,

Ken

Kenneth Q. Vo, M.S., P.E.  
Bridge Rating Engineer

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\*\*\*\*\*  
Mikhael T Zaarour/HQ/Caltrans/CAGov