

**CONCRETE BRIDGE DECK
WITH ISOTROPIC REINFORCING**

CONSTRUCTION REPORT

**USBR Canal Bridge
The Dalles - California Highway
Klamath Falls, Oregon**

Experimental Features

by

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Prepared for

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Salem, Oregon 97310

and

Federal Highway Administration
Washington, D.C. 20590

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12. Sponsoring Agency Name and Address Federal Highway Administration 530 Center Street NE Salem, OR 97301				13. Type of Report and Period Covered	
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16. Abstract Isotropic reinforcing is the placement of reinforced steel uniformly both longitudinally and transversely on the bottom and top of the bridge deck. It is an alternate to deck reinforcing designs based on the traditional "Westergaard" distribution of bending moments. The Federal Highway Administration (FHWA) approved the use of isotropic reinforcement for this project. Isotropic reinforcing was placed in the USBR Canal Bridge deck (Klamath Falls) and is being evaluated as an Experimental Features project. The bridge deck was constructed in December 1992 in two separate stages. While there were a few problems with this project, none were related to the isotropic reinforced deck being constructed, and will not affect the performance of this deck over time. The bid to install this deck was based on a cost estimate of \$12.36/S.F. (\$133.05/m ²).					
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SI* (MODERN METRIC) CONVERSION FACTORS

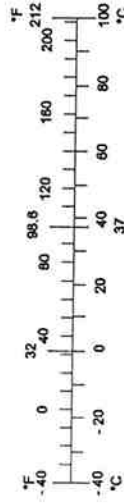
APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<u>LENGTH</u>				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
<u>AREA</u>				
in ²	square inches	645.2	millimeters squared	mm ²
ft ²	square feet	0.093	meters squared	m ²
yd ²	square yards	0.836	meters squared	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	kilometers squared	km ²
<u>VOLUME</u>				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	meters cubed	m ³
yd ³	cubic yards	0.765	meters cubed	m ³
NOTE: Volumes greater than 1000 L shall be shown in m ³ .				
<u>MASS</u>				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg
<u>TEMPERATURE (exact)</u>				
°F	Fahrenheit temperature	5(F-32)/9	Celsius temperature	°C

* SI is the symbol for the International System of Measurement

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<u>LENGTH</u>				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
<u>AREA</u>				
mm ²	millimeters squared	0.0016	square inches	in ²
m ²	meters squared	10.764	square feet	ft ²
ha	hectares	2.47	acres	ac
km ²	kilometers squared	0.386	square miles	mi ²
<u>VOLUME</u>				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	meters cubed	35.315	cubic feet	ft ³
m ³	meters cubed	1.308	cubic yards	yd ³
<u>MASS</u>				
g	grams	0.035	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams	1.102	short tons (2000 lb)	T
<u>TEMPERATURE (exact)</u>				
°C	Celsius temperature	1.8 + 32	Fahrenheit	°F



ACKNOWLEDGMENTS

The author would like to thank the following Oregon Department of Transportation (ODOT) personnel for their help in gathering information and guiding this project: Phil Rabb, Richard Steyskal, Jim Bosket, Steve Starkey, John Stucky, Mike Pulzone, Scott Nodes, Ken Paetz, and Kevin Groom.

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CONCRETE BRIDGE DECK WITH ISOTROPIC REINFORCING

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1.0 INTRODUCTION

Bridge decks in Oregon have traditionally been constructed using a "truss-bar" reinforcement configuration. Although these decks have generally performed satisfactorily in the past, there is a lot of room for error in the fabrication and installation of the reinforcing bars. In order to avoid this problem and to achieve a simpler, easier configuration for reinforcement, the Oregon Department of Transportation decided to construct a deck with isotropic reinforcing on the USBR Canal Bridge (Bridge No. 8345A).

The bridge deck was constructed using conventional materials (Class 4000 concrete and ASTM A615 Grade 60 reinforcing steel) with standard placing and curing practices. The materials were placed to provide uniform reinforcement both longitudinally and transversely along the bottom and top of deck, thereby giving an isotropically reinforced bridge deck.

Isotropic bridge deck reinforcing is being examined as a possible cost-saving alternative. Reduced material requirements and more constructible reinforcing placement are expected to reduce the cost of the initial construction. Long-term savings may result from a reduction in the severity of deck cracking and, consequently, a reduction in deck deterioration.

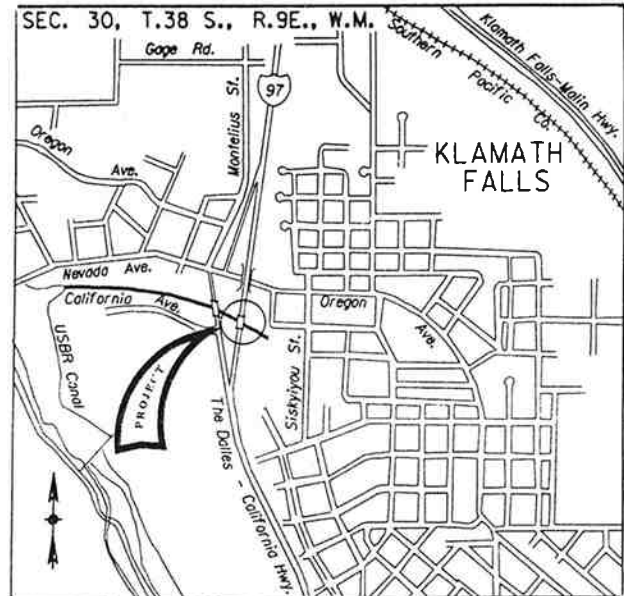
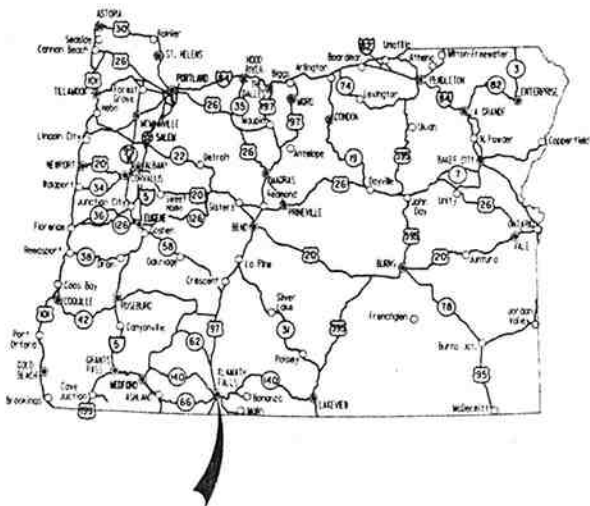
The objective of this project is to evaluate the isotropic reinforced bridge deck constructed on the USBR Canal Bridge. The evaluation will consist of monitoring the construction process, construction costs, maintenance costs, and the overall performance of the deck for a two-year period. This report will cover the construction process and costs.

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND CLIMATE

The project is located on the Dalles - California Highway (US HWY 97) at Mile Post 273.71, Klamath Falls, Oregon, in Klamath County, as shown in Figure 2.1 below.

The project is in the South Central climatic region, which is characterized by cold, dry, snowy winters and warm dry summers. The average daily temperature of the coldest month (January) is 29.6°F (-1.3°C). The average daily temperature of the warmest month (July) is 67.7°F (19.8°C). The area receives an average annual precipitation of 13.5 inches (34.3 cm).



VICINITY MAP
No scale

Figure 2.1 Project Location in Oregon

3.0 DESIGN

3.1 MATERIALS

The main construction materials for the isotropic reinforced bridge deck consists of concrete and reinforced steel. The reinforced steel is ASTM A615 Grade 60 or A706 which is normally specified for the typical bridge deck types found along the state highways in Oregon. There are no "truss bars" in this isotropic reinforced deck.

3.2 PROCESS

All the reinforced steel is straight #5. It is placed on 12-inch (300 mm) centers going both ways along the top and bottom faces of the bridge deck. The spacing is then reduced to 6-inch (150 mm) centers in the areas adjacent to the skewed bents and in the overhang areas to offer more support. In addition, there is a 3-foot (900 mm)-wide closure poured down the center of the bridge where the spacing of the transverse steel is reduced to 6-inches (150 mm) on both the top and bottom faces. The top layer of the reinforced steel is epoxy coated in all areas.

The bridge deck is 8-inches (200 mm) thick, with 2½-inches (65 mm) of concrete cover provided for the top steel and 1¼-inches (30 mm) of concrete cover provided for the bottom steel. The concrete is class 4000. The cement content was increased by the contractor to ensure adequate strength at 7 days.

3.3 SPECIFICATIONS

The design specifications for this project were no different than the specifications which would have been used for a traditional deck design. The isotropic reinforced design also conforms with the current version of the LRFD specifications being developed by AASHTO.

4.0 CONSTRUCTION

4.1 CONSTRUCTION SUMMARY

Mocon Corp. removed the old deck using hydro-demolition and mechanical methods. One longitudinal construction joint exists 1' 6" (460 mm) east of the roadway centerline. This construction joint was necessitated by the staging required in order to maintain traffic on half the bridge while the other half was under construction. A transverse construction joint was formed at each bent. A minimum of three days was required between adjacent placements. Figure 4.1 shows the staging and sequence of the concrete placement. Although there were some problems encountered in removing the old deck, the new deck construction proceeded as expected.

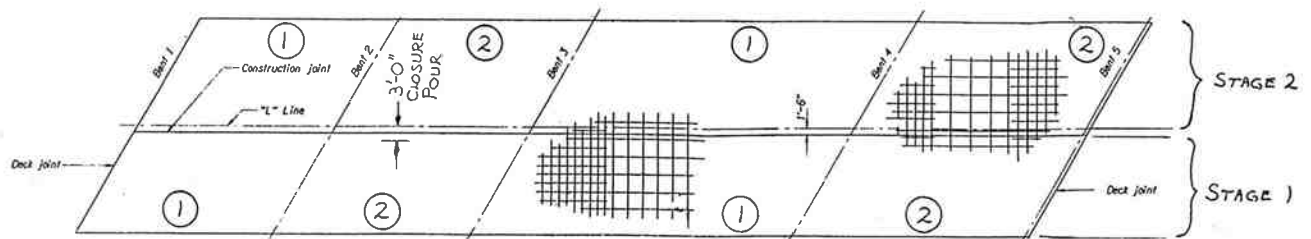


Figure 4.1 Placement Sequence

4.2 CONSTRUCTION OUTLINE

Start of Construction: 07-16-92
End of Construction: 12-31-92 (est.)
Contractor: Mocon Corporation
ODOT Project Manager: Richard Steyskal
ODOT Inspector: Ken Paetz

Discussion Items

1. The contractor did not complete this project by the specified completion date. There was some delay caused by the need for the contractor to repair damage done to the bridge during the deck removal phase. Other delays occurred which were not related directly to the deck replacement part of this project (there was another structure involved in this project). No delays were related to the design or construction of the new deck.
2. The type and spacing of chairs to be used for the reinforcing steel was not adequately specified. The spacing and type of chairs used had to be clarified verbally.

5.0 EVALUATION

5.1 COSTS

The bid for replacing this deck was \$12.36/Square Foot (S.F.)($\$133.05/m^2$). Bridge deck replacement costs have not been tracked as a discrete item, so comparisons to historical data cannot be made directly. Based on historical data for the costs of materials, ODOT would have expected the isotropic deck for this bridge to cost \$11.10/S.F. ($\$119.48/m^2$) and the "truss-bar" deck to cost \$13.30/S.F. ($\$143.16/m^2$). The bid cost was about \$1.00/S.F. ($\$10.76/m^2$) higher than expected, but still was \$1.00/S.F. ($\$10.76/m^2$) lower than the historical bids for an equivalent "truss-bar" deck.

The discrepancy between the bids for this deck versus ODOT's estimate for this isotropic deck cannot be accounted for. The bid price for the Class 4000 concrete was \$245/C.Y. ($\$320.43/m^3$) versus an ODOT estimate of \$350/C.Y. ($\$457.76/m^3$). The bid price for the reinforcing steel was \$0.47/lb. ($\$1.04/kg$) versus an ODOT estimate of \$0.45/lb. ($\$0.99/kg$). The bid price for the epoxy coated reinforcing steel was \$0.64/lb. ($\$1.41/kg$) versus an ODOT estimate of \$0.65/lb. ($\$1.43/kg$). It is useful to remember that there was other work involved in this project (LMC overlay on another bridge).

5.2 SITE VISIT

The site was visited on November 20, 1992. This was at the close of construction, before traffic had been switched back onto the second stage of the deck replacement. This was done in order to get a good look at the deck before the traffic became an obstruction, and before the weather became worse (rain and/or snow). The purpose of the site visit was to view the finished product, and perform a baseline crack survey. The cracks will be monitored very closely during the evaluation period.

At the time of the site visit, there were very few visible cracks. The only cracks noted were single, very light cracks straight down the bent line. There was one crack at each bent, centered on the bent. These cracks are typical of slabs placed continuously over simple-span girders, and are not related to deck design. There are 3-inches (75 mm) of cover over the top steel instead of the 2½ inches (65 mm) shown in the plans.

Kevin Groom, Mike Pulzone, and Ken Paetz were members of the inspection team. As part of the inspection the underside of the bridge was also inspected. The deck appears to have no serious defects which would have an effect on its long-term performance.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Isotropic reinforcing is easier to design, detail, fabricate, inspect, and install than the typical reinforcing used in bridge decks on the state highways in Oregon. The project inspector seemed very pleased with the overall concept, and thought it contributed directly to fewer problems in the construction of the deck.

This type of deck design should result in a consistently superior product when compared with the traditional "truss-bar" deck. Although there is a savings at the time of installation because of the lower initial cost, that is not the primary benefit ODOT expects to gain from this type of reinforcing. The primary benefit expected is a longer lasting, more durable bridge deck.

6.2 RECOMMENDATIONS

This bridge deck, and other ODOT bridge decks with isotropic reinforcing should be evaluated for several years, until a suitable performance history is developed. If cracks are detected, an attempt should be made to determine if they are the result of service loads, shrinkage, or construction practices.

APPENDIX A
PROJECT SPECIFICATIONS

Project specifications relevant to the experimental features portion of this project, Concrete Bridge Deck With Isotropic Reinforcing, are partially discussed in the Special Provisions and Supplemental Standard Specifications For Highway Construction as follows (1):

SECTION 00530 - STEEL REINFORCEMENT FOR CONCRETE

Furnish and place steel reinforcement according to Section 00530 of the Standard Specifications supplemented and/or modified as follows:

00530.80 Measurement - Measurement of all reinforcement in the structure listed in 00530.82 will be on the lump sum basis.

00530.82 Lump Sum Basis - The estimated quantity of reinforcement to be paid for on the lump sum basis is as follows:

<u>Structure</u>	<u>Quantity</u> <u>(lb.)</u>	
	<u>Uncoated</u>	<u>Coated</u>
8345A	64,600	66,200

SECTION 00540 - CONCRETE BRIDGES

Furnish, place and finish concrete for bridges according to Section 00540 of the Standard Specifications supplemented and/or modified as follows:

00540.15 Process Control - In the Table under 00540.15(c)(2) listing required tests, change the Fineness Modules, Sand Equivalent, and Sieve Analysis testing frequency from "One per 5 Shifts" to "One per Shift".

00540.52(a) General requirements and Limits - Add the following:

All exposed concrete surfaces, except for roadways and sidewalks, shall receive a class 1 surface finish. Sandblast surfaces which have been cured with a

1 *Special Provisions and Supplemental Standard Specifications For Highway Construction 24V-72: U.S.B.R. CANAL (KLAMATH FALLS) BR. SEC. - THE DALLES - CALIFORNIA HIGHWAY, KLAMATH COUNTY. Oregon State Highway Division, Salem, OR, May 1992.*

curing compound to remove the curing compound prior to receiving a Class 1 surface finish.

00540.81 Lump Sum Basis - The estimated quantity of concrete to be paid for on the lump sum basis is as follows:

<u>Structure</u>	<u>Class</u>	<u>Quantity (Cu. Yds.)</u>
8345A	4,000	410

APPENDIX B
CONCRETE SAMPLE & TEST DATA

NOTED
J. STEYSKAL

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

CC PABIZ & J.S.

LABORATORY NO. 9211668

OCT 18 1992

PROJECT	U.S.B.R. CANAL (K.F.) BRIDGE SECTION The Dalles-California Highway		DATA SHEET NO.	C 76095	
STATE	CONTRACT NO: C11208 KLAMATH COUNTY		COUNTY	E. A. SUB JOB 11208	
CONTRACTOR	MOCON CORP.		FA PROJECT NO.	NH-4-1(35)	
PROJECT MANAGER	RICHARD STEYSKAL		AGY.-ORG. UNIT	QTY	TEST NUMBER
SUBMITTED BY	RICHARD STEYSKAL		02-8033	5	719
			02-8033		734X
					90 00
					500

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT)	BRIDGE NO.	STRENGTH REQUIRED
STAGE #1 - SPAN #3 - DECK	8345A	4000 PSI 28 DAYS
CONCRETE SUPPLIER	TYPE OF SAMPLE	SAMPLED BY (PRINT NAME)
JEFFERSON STATE READY MIX	<input type="checkbox"/> CONTROL <input checked="" type="checkbox"/> RECORD	K.E. PASTOR
REPRESENTED BY	SET NO.	DATE CAST
5	1	9-15-92
NO. OF CYLS.	DATE SHIPPED	WITNESSED BY (SIGNATURE)
5	9-17-92	[Signature]

TEST CONCRETE CYLINDER OR BEAM IN DAYS							
A 7 DAYS	B 14 DAYS	C 28 DAYS	D 28 DAYS	E 28 DAYS	F _____ DAYS	G _____ DAYS	H _____ DAYS

CEMENT:	BRAND	TYPE	LAB OR MILL ANALYSIS NO.	ADDITIVES:	BRAND	TYPE
	CALUMNAS	I-II LA	CON # 673		WASTELBINDER	MBUR

MIX DESIGN:	LAB OR I.D. NO.	DESIGN STRENGTH	AGGREGATE SOURCE NO.	CEMENT CONTENT	SLUMP	AIR CONTENT	MAX W/C RATIO
	92-09402	4000	18-101-4	700 lbs/cu yd	3-5 IN.	6 %	0.40 BY WT.

FIELD TEST RESULTS	TOTAL FIELD MOISTURE CONTENT %	UNIT WT	CEMENT CONTENT	SLUMP	AIR CONTENT	FIELD W/C RATIO
	1-1/2-3/4 - 1" 3.5 FA 7.5	144.01 lbs/cu ft	722 lbs/cu yd	4 IN.	5.2 %	0.36 BY WT.

CONCRETE MIX PROPORTIONS AS BATCHED							
CEMENT	FLYASH	1-1/2 - 3/4 AGG	3/4 - 4 AGG	SAND	WATER	WATER AT JOB SITE	
5600 lbs		14,730 lbs		8300 lbs	180 gal	0 gal	

PRESTRESS CONCRETE:	STEAM HOURS	MAX TEMP	REQ. REL. STR.	ACT. REL. STR.	CYLINDER CURE	HRS OR DAYS
					STD _____ DAYS	FIELD _____ DAYS

FIELD REMARKS: ADDITIONAL 50/cu yd. CEMENT WAS ADDED TO INSURE STRENGTH
 RECORD AIR: 5.2% SLUMP: 4" IN 7 DAYS - CONTRACTOR EXPENSE -
 AIR WAS STARTED AT 7oz/y³, ADDED 2oz/y³ & GOT 5.2% AIR CONTENT -
 AMB AIR TEMP = 75°F COOLER IN TEMP = 72°F
 CONCRETE TEMP = 78°F COVER OUT TEMP = 79°F

LAB USE ONLY BELOW

LABORATORY REPORT	DATE DATA SHEET RECEIVED	DATE CYLINDERS RECEIVED
	9-18-92	9-18-92

CYL. NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED
A	9-22	7	3930	9-23-92
B	9-29	14	4490	9-30-92
C	10-13	28	5340	10-14-92
D	10-13	28	4950	"
E	10-13	28	5200	"
F				
G				
H				

LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM. AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS.

RECEIVED
OCT 16 1992

PROJECT MANAGER: CHEW 8033
 APM CAL COM AOM

AVE. STR:	5160	28 DAYS	TEST TYPE	RESULT
			<input type="checkbox"/> NON-STATISTICAL <input type="checkbox"/> STATISTICAL	<input checked="" type="checkbox"/> PASS
			<input type="checkbox"/> OTHER (Describe)	<input type="checkbox"/> FAIL

- 2X DISTRIBUTION
- X FILES
- X FHWA
- X CSL
- X PROJECT MANAGER
- X REGION GEOLOGIST
- X MATERIALS - PORTLAND
- X MATERIALS - EUGENE
- X CONTRACTOR
- X
- X

RICHARD STEYSKAL
 PAS 4
 MOCON CORPORATION
 JEFFERSON STATE READY MIX
 FRED LUCHT

RECEIVED
 NOV 25 1992
 BRIDGE SECTION

W. J. Quinn
 ENGINEER OF MATERIALS

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

CRUZETZ & J.S.
LABORATORY NO. **9211669**
OCT 18 1992

NOTED BY **R. J. STEYSKAL**

PROJECT: **U.S.B.R. CANAL (K.F.) BRIDGE SECTION**
The Dalles-California Highway

CONTRACT NO: **C11208** COUNTY: _____

CONTRACTOR: **MCCOY CORP** FA PROJECT NO. **NH-4-1(35)** BID ITEM NO. **23**

PROJECT MANAGER: **RICHARD STEYSKAL** AGY.-ORG. UNIT: **02-8033** QTY: **5** TEST NUMBER: **719** VAR: _____ LAB CHARGE: **90.00**

SUBMITTED BY: **RICHARD STEYSKAL** AGY.-ORG. UNIT: **02-8033** TEST NUMBER: **734x** LAB CHARGE: **500.**

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT): **STAGE #1 - SPAN #1 - DECK** BRIDGE NO. **8345A** STRENGTH REQUIRED: **4000** PSI **28** DAYS

CONCRETE SUPPLIER: **JEFFERSON STATE READY MIX** TYPE OF SAMPLE: CONTROL RECORD SAMPLER BY (PRINT NAME): **K.E. FAETZ**

REPRESENTED BY: **5** SET NO.: **2** DATE CAST: **9-15-92** DATE SHIPPED: **9-17-92** WITNESSED BY (SIGNATURE): _____

TEST CONCRETE CYLINDER OR BEAM IN DAYS
A **7** DAYS B **14** DAYS C **28** DAYS D **28** DAYS E **28** DAYS F _____ DAYS G _____ DAYS H _____ DAYS

CEMENT: BRAND **Calumet I-ILCA** TYPE **CEM #673** ADDITIVES: **MASTER BUILDER ABC-80** TYPE **ABUR**

MIX DESIGN: LAB OR I.D. NO. **92-09402** DESIGN STRENGTH **4000** AGGREGATE SOURCE NO. **18-101-4** CEMENT CONTENT **700** lbs/cu yd SLUMP **3-5** IN. AIR CONTENT **6** % MAX W/C RATIO **0.40** BY WT.

FIELD TEST RESULTS: TOTAL FIELD MOISTURE CONTENT % **3.5** UNIT WT. **146.42** lb/cu ft CEMENT CONTENT **735** lbs/cu yd SLUMP **4 1/4** IN. AIR CONTENT **3.8** % FIELD W/C RATIO **0.36** BY WT.

CONCRETE MIX PROPORTIONS AS BATCHED: CEMENT **1010** lbs FLYASH _____ lbs SAND **18,400** lbs WATER **230** gal WATER AT JOB SITE **0** gal

PRESTRESS CONCRETE: STEAM HOURS _____ HRS MAX TEMP _____ REQ. REL. STR. _____ ACT. REL. STR. _____ CYLINDER CURE: STD _____ DAYS FIELD _____ DAYS HRS OR DAYS

FIELD REMARKS: **CONTRACTOR WAS AT 902/4³ - TRWD 802 = LOW AIR - AIR ADDITIONAL 202/4³ WAS ADDED AND GOT 5.0% AIR CONTENT - CONTRACTORS USING MASTER BUILDER ABUR HAVE BEEN EXPERIENCING THESE UNSTABLE AIR CONTENTS THIS SUMMER. NO EXPLANATION AT THIS TIME ?? AHHH. AIR TEMP. - 80°F - CONG. TEMP. 73°F**

COOLER IN TEMP - 70°F LAB USE ONLY BELOW COOLER OUT TEMP = 80°F

LABORATORY REPORT: DATE DATA SHEET RECEIVED **9-18-92** DATE CYLINDERS RECEIVED **9-18-92**

CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED
A	9-22	7	440	9-23-92
B	9-29	14	570	9-30-92
C	10-13	28	5870	10-14-92
D	10-13	28	5910	"
E	10-13	28	5940	"
F				
G				
H				

LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS.

RECEIVED
OCT 16 1992

PROJECT MANAGER - CREW 8033
M APM L CS OM AOM

AVE. STR: **5910** 28 DAYS

TEST TYPE: NON-STATISTICAL STATISTICAL OTHER (Describe) _____ RESULT: PASS FAIL

- X DISTRIBUTION
- X FILES
- X FHWA
- X CSL
- X PROJECT MANAGER **RAS 4**
- X REGION GEOLOGIST
- X MATERIALS - PORTLAND **MOON CORPORATION**
- X MATERIALS - EUGENE
- X CONTRACTOR **JEFFERSON STATE READY MIX**
- X **FRED LUCHT**

W. J. Quinn
ENGINEER OF MATERIALS

SAMPLE DATA AND LABORATORY TEST REPORT FOR CONCRETE CYLINDERS

cc PRETZ & J.S.

HIGHWAY DIVISION



U.S. R. CANAL (K.F.) BRIDGE SECTION THE OREGON-CALIFORNIA HIGHWAY CONTRACT NO: C11208 KLAMATH COUNTY

LABORATORY NO. 9211808 OCT 26 1992
DATA SHEET NO. C 76097 MA

PROJ. MGR. R. J. STEYSKAL

WAY _____ COUNTY _____ E. A. SUB JOB 11208

CONTRACTOR MOCON CORP. FA PROJECT NO. NA-4-1(35) BID ITEM NO. 23

PROJECT MANAGER RICHARD STEYSKAL AGY.-ORG. UNIT 02-8033 QTY 5 TEST NUMBER 719 VAR _____ LAB CHARGE 90.00
SUBMITTED BY RICHARD STEYSKAL AGY.-ORG. UNIT 02-8033 TEST NUMBER 734x LAB CHARGE 500

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT) STAGE #1, SPANS #2 & 4 DECK BRIDGE NO. 8345A STRENGTH REQUIRED 4000 PSI 28 DAYS
CONCRETE SUPPLIER JEFFERSON STATE READY-MIX TYPE OF SAMPLE CONTROL RECORD SAMPLED BY (PRINT NAME) R.E. PRETZ
REPRESENTED BY _____ SET NO. 3 DATE CAST 9-18-92 DATE SHIPPED 9-21-92 WITNESSED BY (SIGNATURE) _____
NO. OF CYLS. 5

TEST CONCRETE CYLINDER OR BEAM IN DAYS
A 7 DAYS B 14 DAYS C 28 DAYS D 28 DAYS E 28 DAYS F _____ DAYS G _____ DAYS H _____ DAYS

CEMENT: BRAND CALABRESA I-II L.A. TYPE CERT # 674 ADDITIVES: MASTER BUILDER MBR
LAB OR I.D. NO. 92-09402 DESIGN STRENGTH 4000 AGGREGATE SOURCE NO. 18-101-4 CEMENT CONTENT 700 lbs/cu yd SLUMP 3-5 IN. AIR CONTENT 6.0 % MAX W/C RATIO 0.40 BY WT.

MIX DESIGN: LAB OR I.D. NO. 92-09402 DESIGN STRENGTH 4000 AGGREGATE SOURCE NO. 18-101-4 CEMENT CONTENT 700 lbs/cu yd SLUMP 3-5 IN. AIR CONTENT 6.0 % MAX W/C RATIO 0.40 BY WT.

FIELD TEST RESULTS TOTAL FIELD MOISTURE CONTENT % 3.5 UNIT WT 145.7 lbs/cu ft CEMENT CONTENT 734.1 lbs/cu yd SLUMP 3 1/2 IN. AIR CONTENT 4.8 % FIELD W/C RATIO 0.34 BY WT.

CONCRETE MIX PROPORTIONS AS BATCHED
CEMENT 1025 lbs FLYASH _____ lbs 1-1/2 - 3/4 AGG 18,415 lbs 3/4 - 4 AGG _____ lbs SAND 10,350 lbs WATER 220 gal WATER AT JOB SITE _____ gal

PRESTRESS CONCRETE: STEAM HOURS _____ MAX TEMP _____ REQ. REL. STR. _____ ACT. REL. STR. _____ CYLINDER CURE STD _____ DAYS FIELD _____ DAYS

FIELD REMARKS: AN ADDITIONAL 50 LBS/Y3 OF CEMENT HAS BEEN ADDED BY THE CONTRACTOR TO INSURE STRENGTH IN 7 DAYS -
AAMB. AIR. TEMP = 55°F
CONCRETE TEMP = 72°F
COOLER IN TEMP = 72°F - COOLER TEMP OUT = 80°F

LAB USE ONLY BELOW

LABORATORY REPORT					DATE DATA SHEET RECEIVED	DATE CYLINDERS RECEIVED
CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED	LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFLECTIONS OR FAILING CYLINDERS. RECEIVED OCT 22 1992 PROJECT MANAGER CREW 8033 M <input type="checkbox"/> APR <input type="checkbox"/> MAY <input type="checkbox"/> JUN <input type="checkbox"/> JUL <input type="checkbox"/> AUG <input type="checkbox"/> SEPT <input type="checkbox"/> OCT <input type="checkbox"/> NOV <input type="checkbox"/> DEC <input type="checkbox"/>	
A	9-25	7	4950	9-28-92		
B	10-2	14	5760	10-5-92		
C	10-16	28	6070	10-16-92		
D	10-16	28	6380	"		
E	10-16	28	6610	"		
F						
G						
H						

AVE. STR: 6350 28 DAYS TEST TYPE _____ RESULT PASS FAIL

- X DISTRIBUTION FILES FHWA CSL
- X PROJECT MANAGER RICHARD STEYSKAL
- X REGION GEOLOGIST RAS 4
- X MATERIALS - PORTLAND MOCON CORPORATION
- X MATERIALS - EUGENE JEFFERSON STATE READY-MIX
- X CONTRACTOR FRED LUCHT

W. J. Quinn
ENGINEER OF MATERIALS

NOTED
J. STEYSKAL
U.S.B.R. CANAL (W.F.) BRIDGE SECTION
THE DALLES-CALIFORNIA HIGHWAY
CONTRACT NO: C11208
KLAMATH COUNTY

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

cc Portz E.J.S.
LABORATORY NO. 9211809 OCT 26 1992

PROJECT VAY		COUNTY		DATA SHEET NO. C 76098 MR	
CONTRACTOR MOCON CORP.		FA PROJECT NO. NH-4-1(35)		BID ITEM NO. 23	
PROJECT MANAGER RICHARD STEYSKAL		AGY. ORG. UNIT 02-8033	QTY 5	TEST NUMBER 719	VAR 90⁰⁰
SUBMITTED BY RICHARD STEYSKAL		AGY. ORG. UNIT 02-8033		734X	500.

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT) STAGE #1 - SPANS #2 & 4, DECK			BRIDGE NO. 8345A	STRENGTH REQUIRED 4000 PSI 28 DAYS	
CONCRETE SUPPLIER JEFFERSON STATE READY MIX		TYPE OF SAMPLE <input checked="" type="checkbox"/> CONTROL <input type="checkbox"/> RECORD		SAMPLED BY (PRINT NAME) E. PORTZ	
REPRESENTED BY 5	SET NO. 4	DATE CAST 9-18-92	DATE SHIPPED 9-21-92	WITNESSED BY (SIGNATURE)	

TEST CONCRETE CYLINDER OR BEAM IN DAYS
A 7 DAYS B 14 DAYS C 28 DAYS D 28 DAYS E 28 DAYS F _____ DAYS G _____ DAYS H _____ DAYS

CEMENT:	BRAND CAROLINA	TYPE I-II L.A.	LAB OR MILL ANALYSIS NO. CON #674	ADDITIVES:	BRAND MASTER BUILDER	TYPE MBUR
MIX DESIGN:	LAB OR I.D. NO. 92-09402	DESIGN STRENGTH 4000	AGGREGATE SOURCE NO. 18-101-4	CEMENT CONTENT 700 lbs/cu yd	SLUMP 3-5 IN.	AIR CONTENT 6.0 %
FIELD TEST RESULTS	TOTAL FIELD MOISTURE CONTENT % 1-1/2-3/4 _____ 3-5 _____	UNIT WT 7.5 lbs/cu ft	CEMENT CONTENT 706.5 lbs/cu yd	SLUMP 3 1/2 IN.	AIR CONTENT 5.0 %	FIELD W/C RATIO 0.35 BY WT.
PRESTRESS CONCRETE:	CEMENT 5610 lbs	FLYASH _____ lbs	CONCRETE MIX PROPORTIONS AS BATCHED 1-1/2 - 3/4 AGG _____ lbs	SAND 14,710 lbs	WATER 170 gal	WATER AT JOB SITE 4 gal

FIELD REMARKS: **AN ADDITION 50 LBS/Y³ OF CEMENT HAS BEEN ADDED BY THE CONTRACTOR TO INSURE STRENGTH IN 7 DAYS -**
AMB-AIR TEMP. = 65°F
CONCRETE TEMP. = 72°F
COOLER IN TEMP = 71°F - COOLER OUT TEMP = 80°F

LAB USE ONLY BELOW

LABORATORY REPORT				DATE DATA SHEET RECEIVED 9-22-92	DATE CYLINDERS RECEIVED 9-22-92
CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED	LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS. RECEIVED OCT 22 1992 CREW 8033 AOM
A	9-25	7	4180	9-28-92	
B	10-2	14	5650	10-5-92	
C	10-16	28	6170	10-16-92	
D	10-16	28	6050	11	
E	10-16	28	6060	11	
F					
H					

AVE. STR: **6090** 28 DAYS

TEST TYPE
 NON-STATISTICAL STATISTICAL PASS
 OTHER (Describe) _____ FAIL

- DISTRIBUTION
- FILES
- FHWA
- CSL
- PROJECT MANAGER
- REGION GEOLOGIST
- MATERIALS - PORTLAND
- MATERIALS - EUGENE
- CONTRACTOR
-
-

RICHARD STEYSKAL
 RAS4
 MOCON CORP.
 JEFFERSON READY MIX
 FRED LUHT

W. J. Quinn
 ENGINEER OF MATERIALS

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

LABORATORY NO. NOV 19 1992
9214132

PROJECT U.S.R. CANAL R.F.T. BRIDGE SECTION THE DALLES-CALIFORNIA HIGHWAY CONTRACT NO: C11208		DATA SHEET NO. C 88459	
WAY KLAMATH COUNTY		E. A. SUB JOB 11208	
CONTRACTOR MOCON CORP.		FA PROJECT NO. NH-4-1(35)	BID ITEM NO. 23
PROJECT MANAGER RICHARD STEYSKAL	AGY.-ORG. UNIT 02-8033	QTY 5	TEST NUMBER 719
SUBMITTED BY RICHARD STEYSKAL	AGY.-ORG. UNIT 02-8033		LAB CHARGE 90.00
			5.00

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT) STAGE #2, SPAN #2, DECK		BRIDGE NO. 8345A	STRENGTH REQUIRED 4000 PSI 28 DAYS
CONCRETE SUPPLIER JEFFERSON STATE READY MIX	TYPE OF SAMPLE <input checked="" type="checkbox"/> CONTROL <input type="checkbox"/> RECORD		SAMPLED BY (PRINT NAME) K.E. PAETZ
REPRESENTED BY	SET NO. 8	DATE CAST 11-7-92	DATE SHIPPED 11-9-92
NO. OF CYLS. 5			

TEST CONCRETE CYLINDER OR BEAM IN DAYS							
A 7 DAYS	B 14 DAYS	C 28 DAYS	D 28 DAYS	E 28 DAYS	F _____ DAYS	G _____ DAYS	H _____ DAYS

CEMENT:	BRAND CALABRES ILLA	TYPE CON #676	LAB OR MILL ANALYSIS NO.	ADDITIVES:	BRAND MASTER BUILDER	TYPE MSUR
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MIX DESIGN:	LAB OR I.D. NO. 92-09402	DESIGN STRENGTH 4000	AGGREGATE SOURCE NO. 18-101-4	CEMENT CONTENT 650 lbs/cu yd	SLUMP 3-4 IN.	AIR CONTENT 6.0%	MAX W/C RATIO 0.40 BY WT.
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FIELD TEST RESULTS MSUR -30 FIVES 25% 336 oz	TOTAL FIELD MOISTURE CONTENT % 1-1/2-3/4 - 3.0	UNIT WT 140.62 lbs/cu ft	CEMENT CONTENT 686.22 lbs/cu yd	SLUMP 4 1/4 IN.	AIR CONTENT 6.2%	FIELD W/C RATIO 0.32 BY WT.
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CONCRETE MIX PROPORTIONS AS BATCHED							
CEMENT 5640 lbs	FLYASH	1-1/2 - 3/4 AGG 14640 lbs	3/4 - 4 AGG	SAND 9528 lbs	WATER 160 gal	WATER AT JOB SITE 5 gal	

PRESTRESS CONCRETE:	STEAM HOURS	MAX TEMP	REQ. REL. STR.	ACT. REL. STR.	CYLINDER CURE STD _____ DAYS	FIELD _____ DAYS	HRS OR DAYS
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FIELD REMARKS: AMB. AIR TEMP. - 45°F
CONCRETE TEMP. - 63°F
COOLER IN TEMP. - 71°F
COOLER OUT TEMP. - 78°F

LAB USE ONLY BELOW

LABORATORY REPORT					DATE DATA SHEET RECEIVED 11-10-92	DATE CYLINDERS RECEIVED 11-10-92
CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED	LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS.	
A	11-14	7	2510	11-16-92	<p style="text-align: center; font-size: 2em; font-weight: bold;">RECEIVED</p> <p style="text-align: center;">NOV 18 1992</p> <p style="text-align: center;">PROJECT MANAGER CREW 8033</p> <p style="text-align: center;"> <input type="checkbox"/> APM <input type="checkbox"/> CS <input type="checkbox"/> OM <input type="checkbox"/> AOM </p>	
B	11-21	14				
C	12-5	28				
D	12-5	28				
E	12-5	28				
F						
G						
H						

AVE. STR: 28 DAYS

TEST TYPE
 NON-STATISTICAL STATISTICAL OTHER (Describe) _____

RESULT
 PASS FAIL

- X DISTRIBUTION
- X FILES
- X FHWA
- X CSL
- X PROJECT MANAGER
- X REGION GEOLOGIST
- X MATERIALS - PORTLAND
- X MATERIALS - EUGENE
- X CONTRACTOR

RICHARD STEYSKAL
RAS 4
MOCON CORPORATION
JEFFERSON STATE READY MIX
FRED. LICHT

W. J. Quinn
ENGINEER OF MATERIALS

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

LABORATORY NO. NOV 19 1992
9214131

PROJECT U.S.B.R. CANAL (R.F.) BRIDGE SECTION THE DALLES-CALIFORNIA HIGHWAY CONTRACT NO: C11208 KLAMATH COUNTY		DATA SHEET NO. C 88458	
HIGHWAY		E. A. SUB JOB 11208	
CONTRACTOR MOCON CORP.		FA PROJECT NO. NH-4-1(35)	BID ITEM NO. 23
PROJECT MANAGER RICHARD STEYSKAL	AGY.-ORG. UNIT 02-8033	QTY 5	TEST NUMBER 719
SUBMITTED BY RICHARD STEYSKAL	AGY.-ORG. UNIT 02-8033		LAB CHARGE 90.00
			5.00

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT) STAGE #2, SPAN #4, DECK		BRIDGE NO. 8345A	STRENGTH REQUIRED 4000 PSI 28 DAYS	
CONCRETE SUPPLIER JEFFERSON STATE READY-MIX	TYPE OF SAMPLE <input checked="" type="checkbox"/> CONTROL <input type="checkbox"/> RECORD		SAMPLED BY (PRINT NAME) K.E. PAETZ	
REPRESENTED BY	SET NO. 7	DATE CAST 11-7-92	DATE SHIPPED 11-9-92	WITNESSED BY (SIGNATURE)
NO. OF CYLS. 5				

TEST CONCRETE CYLINDER OR BEAM IN DAYS							
A 7 DAYS	B 14 DAYS	C 28 DAYS	D 28 DAYS	E 28 DAYS	F	G	H
CEMENT:	BRAND CALDWELL	TYPE I-II C.A.	LAB OR MILL ANALYSIS NO. CEN# 676	ADDITIVES:	BRAND MASTON BUNKER	TYPE MBUR NBL-80	
MIX DESIGN:	LAB OR I.D. NO. 92-09402	DESIGN STRENGTH 4000	AGGREGATE SOURCE NO. 18-101-4	CEMENT CONTENT 650 lbs/cu yd	SLUMP 3-4 IN.	AIR CONTENT 6.0 %	MAX W/C RATIO 0.40 BY WT.
FIELD TEST RESULTS	TOTAL FIELD MOISTURE CONTENT % 1-1/2-3/4 3.0	UNIT WT FA 7.5	CEMENT CONTENT 142.82	SLUMP 696.95	AIR CONTENT 3 3/4 IN.	FIELD W/C RATIO 6.0 %	BY WT. 0.32
CONCRETE MIX PROPORTIONS AS BATCHED							
CEMENT 336 oz	FLYASH 5640 lbs	1-1/2 - 3/4 AGG 14640 lbs	3/4 - 4 AGG 14640 lbs	SAND 9528 lbs	WATER 160 gal	WATER AT JOB SITE 5 gal	
PRESTRESS CONCRETE:	STEAM HOURS	MAX TEMP	REQ. REL. STR.	ACT. REL. STR.	CYLINDER CURE		
	HRS				STD	DAYS	FIELD

FIELD REMARKS: A.M.B. AIR TEMP. - 42°F
CONCRETE TEMP. - 64°F
COOLER IN TEMP. - 70°F
COOLER OUT TEMP. - 76°F

LAB USE ONLY BELOW

LABORATORY REPORT					DATE DATA SHEET RECEIVED 11-10-92	DATE CYLINDERS RECEIVED 11-10-92
CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED	LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS.	
A	11-14	7	3330	11-16-92	<p style="text-align: center; font-size: 2em; font-weight: bold;">RECEIVED</p> <p style="text-align: center;">NOV 18 1992</p> <p style="text-align: center;">PROJECT MANAGER - CREW 8033</p> <p style="text-align: center;">OM APM CS OM AOM</p>	
B	11-21	14				
C	12-5	28				
D	12-5	28				
E	12-5	28				
F						
G						
H						
AVE. STR:				28 DAYS		

- DISTRIBUTION
- X FILES
 - X FHWA
 - X CSL
 - X PROJECT MANAGER
 - X REGION GEOLOGIST
 - X MATERIALS - PORTLAND
 - X MATERIALS - EUGENE
 - X CONTRACTOR
 - X
 - X

RICHARD STEYSKAL
RAS 4
MOCON CORPORATION
JEFFERSON STATE READY MIX

TEST TYPE
 NON-STATISTICAL STATISTICAL OTHER (Describe)

RESULT
 PASS FAIL

W. J. Quinn
ENGINEER OF MATERIALS

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

LABORATORY NO. **9213951**
NOV 23 1992

PROJECT U.S.A. CANAL (K.F.) BRIDGE SECTION THE DALLES-CALIFORNIA HIGHWAY CONTRACT NO: C11208		DATA SHEET NO. C 88456	
WAY KLAMATH COUNTY		E. A. SUB JOB 11208	
CONTRACTOR MOCON CORP.		FA PROJECT NO. NA-4-1(35)	BID ITEM NO. 23
PROJECT MANAGER RICHARD STEYSKAL	AGY.-ORG. UNIT 02-8033	QTY 5	TEST NUMBER 719
SUBMITTED BY RICHARD STEYSKAL	AGY.-ORG. UNIT 02-8033		VAR 90⁰⁰
			LAB CHARGE 5⁰⁰

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT) STAGE #2, SPAN #1 - DOCK		BRIDGE NO. 8345A	STRENGTH REQUIRED 4000 PSI 28 DAYS	
CONCRETE SUPPLIER JEFFERSON STATE READY MIX		TYPE OF SAMPLE <input checked="" type="checkbox"/> CONTROL <input type="checkbox"/> RECORD		SAMPLED BY (PRINT NAME) K.E. HAETZ
REPRESENTED BY 5	SET NO. 5	DATE CAST 11-4-92	DATE SHIPPED 11-5-92	
WITNESSED BY (SIGNATURE)				

TEST CONCRETE CYLINDER OR BEAM IN DAYS							
A 7 DAYS	B 14 DAYS	C 28 DAYS	D 28 DAYS	E 28 DAYS	F _____ DAYS	G _____ DAYS	H _____ DAYS

CEMENT:	BRAND CARAVANAS	TYPE I-II L.A.	LAB OR MILL ANALYSIS NO. CON #676	ADDITIVES:	BRAND MASTERSULK	TYPE MOUR	
MIX DESIGN:	LAB OR I.D. NO. 92-09402	DESIGN STRENGTH 4000	AGGREGATE SOURCE NO. 18-101-4	CEMENT CONTENT 650 lbs/cu yd	SLUMP 3-4 IN.	AIR CONTENT 6.0 %	MAX W/C RATIO 0.40 BY WT.
FIELD TEST RESULTS	TOTAL FIELD MOISTURE CONTENT % 3.0	UNIT WT 143.25 lbs/cu ft	CEMENT CONTENT 698.99 lbs/cu yd	SLUMP 4 3/4 IN.	AIR CONTENT 5.8 %	FIELD W/C RATIO 0.33 BY WT.	
CONCRETE MIX PROPORTIONS AS BATCHED	CEMENT 5650 lbs	FLYASH _____ lbs	1-1/2 - 3/4 AGG 14,445 lbs	SAND 9530 lbs	WATER 165 gal	WATER AT JOB SITE 5 gal	
PRESTRESS CONCRETE:	STEAM HOURS _____ HRS	MAX TEMP _____ °	REQ. REL. STR. _____ °	ACT. REL. STR. _____ °	CYLINDER CURE STD _____		HRS OR _____

FIELD REMARKS: **AMB. AIR TEMP. 54°F**
CONCRETE TEMP. 66°F
COOLER IN TEMP. 70°F
COOLER OUT TEMP. 76°F

RECEIVED
NOV 23 1992

PROJECT MANAGER CREW 80
APM/CS/NOVA AO

CONCRETE WAS PUMPED!

LAB USE ONLY BELOW

LABORATORY REPORT					DATE DATA SHEET RECEIVED 11-6-92	DATE CYLINDERS RECEIVED 11-6-92
CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED	LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS.	
A	11-11	7	3930	11-16-92		
B	11-18	14	4460	11-20-92		
C	12-2	28				
D	12-2	28				
E	12-2	28				
F						
G						
H						

AVE. STR: **28 DAYS**

TEST TYPE
 NON-STATISTICAL STATISTICAL OTHER (Describe) _____
RESULT
 PASS FAIL

- X DISTRIBUTION
- X FILES
- X FHWA
- X CSL
- X PROJECT MANAGER
- X REGION GEOLOGIST
- X MATERIALS - PORTLAND
- X MATERIALS - EUGENE
- X CONTRACTOR
- X
- X
- X

RICHARD STEYSKAL
RAS 4
MOCON CORPORATION
JEFFERSON STATE READY MIX
FRED LUCHT

W. J. Quinlan
ENGINEER OF MATERIALS

SAMPLE DATA AND LABORATORY TEST REPORT
FOR
CONCRETE CYLINDERS

CC PAETZ & JS
LABORATORY NO. NOV 23 1992
9214074

PROJECT U.S. CANAL (M.F.) BRIDGE SECTION THE DALLES-CALIFORNIA HIGHWAY CONTRACT NO: C11208		DATA SHEET NO. C 88457	
COUNTY KLAMATH COUNTY		E. A. SUB JOB 11208	
CONTRACTOR MOCON CORP.		FA PROJECT NO. NH-4-1(35)	BID ITEM NO. 23
PROJECT MANAGER RICHARD STEYSKAL	AGY. ORG. UNIT 02-8033	QTY 5	TEST NUMBER 719
SUBMITTED BY RICHARD STEYSKAL	AGY. ORG. UNIT 02-8033		LAB CHARGE 90.00
			5.00

SAMPLE DATA

CONCRETE FOR USE IN (LOCATION OR PLACEMENT) STAGE #2, SPAN #3 DECK		BRIDGE NO. 8345A	STRENGTH REQUIRED 4000 PSI 28 DAYS
CONCRETE SUPPLIER JEFFERSON STATE READY MIX	TYPE OF SAMPLE <input checked="" type="checkbox"/> CONTROL <input type="checkbox"/> RECORD		SAMPLED BY (PRINT NAME) K.E. PAETZ
REPRESENTED BY 5	SET NO. 6	DATE CAST 11-5-92	DATE SHIPPED 11-6-92
WITNESSED BY (SIGNATURE) K.E. PAETZ			

TEST CONCRETE CYLINDER OR BEAM IN DAYS							
A 7 DAYS	B 14 DAYS	C 28 DAYS	D 28 DAYS	E 28 DAYS	F	G	H

CEMENT:	BRAND COLUMBIAS I-II L.A. CEMENT #676	TYPE I-II L.A. CEMENT #676	LAB OR MILL ANALYSIS NO.	ADDITIVES: PLASTER BINDER DABL-80	BRAND	TYPE LABOR	
MIX DESIGN:	LAB OR I.D. NO. 92-09402	DESIGN STRENGTH 4000	AGGREGATE SOURCE NO. 18/01-4	CEMENT CONTENT 650 lbs/cu yd	SLUMP 3-4 IN.	AIR CONTENT 6.0 %	MAX W/C RATIO 0.40 BY WT.
FIELD TEST RESULTS	TOTAL FIELD MOISTURE CONTENT % 1-1/2-3/4 - 1.3-0	UNIT WT 7.5	CEMENT CONTENT 144.02	SLUMP 3 IN.	AIR CONTENT 5.0 %	FIELD W/C RATIO 0.33 BY WT.	
ADMITTIVES 336 oz	CEMENT 5640 lbs	FLYASH	CONCRETE MIX PROPORTIONS AS BATCHED 1-1/2-3/4 AGG 144.40 lbs	SAND 9528 lbs	WATER 460 gal	WATER AT JOB SITE 7 gal	
PRESTRESS CONCRETE:	STEAM HOURS	MAX TEMP	REQ. REL. STR.	ACT. REL. STR.	CYLINDER CURE STD _____ DAYS FIELD _____ DAYS		

FIELD REMARKS:
AMB. AIR TEMP. - 45°F
CONCRETE TEMP. - 67°F
COOLER IN TEMP. - 70°F
CONCRETE OUT TEMP. - 75°F

RECEIVED
NOV 23 1992

PROJECT MANAGER - CREW 8033
APM [Signature]

CONCRETE WAS PUMPED

LAB USE ONLY BELOW

LABORATORY REPORT					DATE DATA SHEET RECEIVED 11-9-92	DATE CYLINDERS RECEIVED 11-9-92
CYL NO.	DATE OF BREAK	AGE DAYS	STRENGTH PSI	DATE REPORTED	LAB REMARKS: INCLUDE MAX. LOAD, AVG. DIAM., AREA, AND OBSERVED DEFECTS FOR FAILING CYLINDERS.	
A	11-12	7	4240	11-16-92		
B	11-19	28	4770	11-20-92		
C	12-3	28				
D	12-3	28				
E	12-3	28				
F						
G						
H						

AVE. STR:	28 DAYS	TEST TYPE	RESULT
		<input type="checkbox"/> NON-STATISTICAL <input type="checkbox"/> STATISTICAL	<input type="checkbox"/> PASS
		<input type="checkbox"/> OTHER (Describe) _____	<input type="checkbox"/> FAIL

- DISTRIBUTION
- X FILES
- X FHWA
- X SL
- X PROJECT MANAGER
- X REGION GEOLOGIST
- X MATERIALS - PORTLAND
- X MATERIALS - EUGENE
- X CONTRACTOR
- X
- X
- v

RICHARD STEYSKAL
RAS 4
MOCON CORPORATION
JEFFERSON STATE READY MIX
EUGENE, OREGON

[Signature]
ENGINEER OF MATERIALS