

Señores

Hormigón Express

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Fecha: 4 de mayo de 2007

Asunto: *Evaluación Estadística de los Resultados de la Mezcla del Concreto de 2500 PSI Normal (X125), Planta de Llano Bonito.*

Por este medio les presentamos los resultados de las pruebas de los cilindros de concreto, que fueron realizados con la mezcla de 2500 PSI normal.

1. Todas las pruebas fueron realizadas conforme al ASTM C-39-86, "Compressive Strength of Cylindrical Specimens".
2. El reporte adjunto incluye la siguiente información:
 - Tabla de datos de las pruebas de laboratorio y cálculos estadísticos.
 - Resumen de resultados.
 - Todas las muestras están presentadas con su número de laboratorio, fecha, revenimiento y temperatura.
 - Resistencia del concreto 2500 psi
 - Número de pruebas: 30
3. Estamos adjuntando el análisis estadísticos de las muestras a los 28 días de curado, conforme a la norma **ACI-214-77 "Recommended Practice for Evaluation of Strength Test Results of Concrete"**.
4. El análisis estadístico basado en la tabla 3.5 (ACI-214-77) de estándares de control del concreto (adjunta al informe), nos está indicando que el control de calidad presenta los siguientes resultados.
 - **El rendimiento de ejecución del concreto es EXCELENTE**
 - **La competencia en las pruebas del control de campo del laboratorio es EXCELENTE**

5. Recomendaciones:

Mantener un buen control en la producción de las mezclas y en el muestreo para asegurar la resistencia de las mismas.

6. Para cualquier pregunta puede contactar al teléfono 221-6526

Preparado por:

Ing. Nicolás Acevedo.

CONTROL OF QUALITY FOR PRODUCED MIXTURES OF CONCRETE FOR SPECIFIED STRENGTH

COMPANY: HORMIGON EXPRESS (LLANO BONITO)

MIXTURE: X125 (NORMAL DE 2500)

DATE: MAY 3 OF 2007

BASED: ACI 214R-02

STRENGTH OF DESIGN (PSI):	2500.00
SIZE OF TEST (PAIR CYLINDERS):	24

Test N°	Cylinders File N°	Date of Test	Slump	Temp of concrete	Cylinder Strength (PSI)		Range R (PSI)	Average two cylinder (PSI)	Arithmetic (PSI)	Comments
					Cylinder A	Cylinder B				
1	054	26/2/02	4.00 PLG	82.00 °F	2299.00	2299.00	0.00	2299.00	2299.00	Quality of future concrete placement must be improved
2	067	03/12/02	4.50 PLG	80.00 °F	1963.00	1963.00	1.00	1963.00	2131.00	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
3	074	20/3/02	5.00 PLG	80.00 °F	1985.00	1990.00	5.00	1987.50	2083.17	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
4	094	04/05/02	5.00 PLG	85.00 °F	2211.00	2211.00	0.00	2211.00	2053.83	Quality of future concrete placement must be improved
5	070	14/3/02	4.50 PLG	81.00 °F	1789.00	1789.00	0.00	1789.00	1989.17	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
6	122	04/05/02	4.00 PLG	85.00 °F	2211.00	2193.00	18.00	2202.00	2060.67	Quality of future concrete placement must be improved
7	135	21/5/02	4.00 PLG	80.00 °F	2405.00	2370.00	35.00	2387.50	2119.50	Quality of future concrete placement must be improved
8	155	06/06/02	4.00 PLG	80.00 °F	2529.00	2529.00	0.00	2529.00	2372.83	Quality of future concrete placement must be improved
9	166	21/6/02	4.00 PLG	85.00 °F	1892.00	1857.00	35.00	1874.50	2263.67	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
10	190	26/7/02	4.00 PLG	80.00 °F	2388.00	2299.00	89.00	2343.50	2249.00	Quality of future concrete placement must be improved
11	198	08/12/02	4.00 PLG	78.00 °F	2140.00	2122.00	18.00	2131.00	2116.33	Quality of future concrete placement must be improved
12	207	31/8/02	4.00 PLG	85.00 °F	2122.00	2140.00	18.00	2131.00	2201.83	Quality of future concrete placement must be improved
13	217	13/9/02	4.50 PLG	80.00 °F	1782.00	1788.00	6.00	1785.00	2009.00	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
14	219	18/7/02	3.00 PLG	80.00 °F	1910.00	1928.00	18.00	1919.00	1938.33	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
15	220	19/9/02	3.75 PLG	80.00 °F	1945.00	1963.00	18.00	1954.00	1879.33	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
16	251	10/10/02	3.50 PLG	85.00 °F	1786.00	1857.00	71.00	1821.50	1898.17	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
17	283	19/11/02	2.00 PLG	85.00 °F	2370.00	2352.00	18.00	2361.00	2045.50	Quality of future concrete placement must be improved
18	302	5/12/02	4.50 PLG	87.00 °F	2193.00	2299.00	106.00	2246.00	2142.83	Quality of future concrete placement must be improved
19	303	6/12/02	4.50 PLG	89.00 °F	2193.00	2288.00	95.00	2240.50	2282.50	Quality of future concrete placement must be improved
20	312	12/12/02	5.00 PLG	84.00 °F	2564.00	2582.00	18.00	2573.00	2353.17	Quality of future concrete placement must be improved
21	318	16/2/02	5.00 PLG	85.00 °F	1981.00	1998.00	17.00	1989.50	2267.67	Concrete placed in this area must be investigated and quality of future concrete placement must be improved
22	051	8/3/02	2.00 PLG	84.00 °F	2210.00	2175.00	35.00	2192.50	2251.67	Quality of future concrete placement must be improved
23	053	7/3/03	4.00 PLG	86.00 °F	2221.00	2052.00	169.00	2136.50	2106.17	Quality of future concrete placement must be improved
24	054	17/3/03	3.50 PLG	86.00 °F	2175.00	2193.00	18.00	2184.00	2171.00	Quality of future concrete placement must be improved
25										
26										
27										
28										
29										
30										

Modification factors for estándar deviation (ACI 318R-99)

Number Test	Modification factor
Less than 15	See table 4.2
15.00	1.16
20.00	1.08
25.00	1.03
30 or more	1.00

RESULTS:

Average Strength: psi	2133.77
Standard Deviation of Averages: psi	224.64
Overall Coefficient of Variation is	10.53

Using Standard deviation the construction is	Excellent
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The coefficient of variation for the test is	1.40
This indicates that testing is	Excellent

Maximun average of two cylinders (PSI):	2573.00
Minimu average of two cylinders (PSI):	1765.00

Standards of concrete for general construction testing (ACI 214R-02)

Class	Operation	Standard Deviation (PSI)	Coefficient of Variation
		5 KSI & BELOW	greater than 5 KSI
Excellent	below 400		below 7.0
Very Good	400 to 500		7.0 to 9.0
Good	500 to 600		9.0 to 11.0
Fair	600 to 700		11.0 to 14.0
Poor	above 700		above 14.0

Within-test variation for general construction testing (ACI 214R-02)

Operation	Coefficient of Variation
Excellent	below 3.0
Very Good	3.0 to 4.0
Good	4.0 to 5.0
Fair	5.0 to 6.0
Poor	above 6

DOCUMENTATION OF CONCRETE PERFORMANCE

ANALYSIS SUMMARY

NUMBER OF TESTS	-----	24	
CORRECTION FACTOR	-----	1.04	(ACI 301R-99)
AVERAGE STRENGTH	-----	2133.77 PSI	
STANDARD DEVIATION	-----	224.64 PSI	
ADJUSTED STANDARD DEVIATION	-----	233.62 PSI	
	$= 1.04 \times 224.64 =$	233.62 PSI	
DESIGN STRENGTH	-----	2500.00 PSI	
MINIMUM REQUIRED AVERAGE STRENGTH	-----	2813.06 PSI	
(1)	$1.34 \times 233.62 + 2500 =$	2813.06 PSI	(ACI 301-96)
(2)	$2.33 \times 233.62 + 2500 - 500 =$	2544.34 PSI	sec. 4.2.3.3a)
CONCRETE PERFORMANCE	-----	Excellent	(ACI-214-77(89))
LABORATORY TESTING PROFICIENCY	-----	Excellent	(ACI-214-77(89))

The above statistical analysis as per ACI 301 sec. 4.2.3.2.a and ACI 318 sec 4.3.1.1