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16. Abstract

In describing the effect of coarse aggregate type on the performance of CRCP, this report documents the design, construction, and monitoring of 32 test sections in Houston, Texas. Constructed to evaluate the performance of pavements built in accordance with the CRCP-89(B) design detail recent developed by TxDOT, these test sections were monitored to determine the field performance of CRCP 2 years after construction, looking in particular at crack spacings and crack width. Then, using the observed performance of the different coarse aggregates, the study team evaluated the recently developed CRCP-89(B) design detail. Finally, using the CRCP-7 computer program, the predicted performance was compared with the measured performance of the CRCP test sections. Based on this comparison, a new model to be used with the CRCP-7 program — one capable of predicting crack widths — was developed.

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MONITORING OF SILICEOUS RIVER GRAVEL AND LIMESTONE CONTINUOUSLY REINFORCED CONCRETE PAVEMENT TEST SECTIONS IN HOUSTON 2 YEARS AFTER PLACEMENT, AND DEVELOPMENT OF A CRACK WIDTH MODEL FOR THE CRCP-7 PROGRAM

by

Miguel Angel Otero Jiménez
B. Frank McCullough
Kenneth Hankins

Research Report Number 1244-4

Evaluation of Performance of Texas Pavements
Made with Different Coarse Aggregates
Research Project 2/3-8-90/2-1244

conducted for the

Texas Department of Transportation

in cooperation with the

U.S. Department of Transportation
Federal Highway Administration

by the

CENTER FOR TRANSPORTATION RESEARCH
Bureau of Engineering Research
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March 1992

NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.

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Study Supervisor

PREFACE

The authors would like to thank all Texas Department of Transportation personnel who contributed to this research study and report. We also thank Mr. Terry Dossey of the Center for Transportation Research for his help with the computer programming.

Miguel Angel Otero Jiménez
B. Frank McCullough
Kenneth Hankins

LIST OF REPORTS

Report No. 422/1244-1, "Field Evaluation of Coarse Aggregate Types: Criteria for Test Sections," by Kenneth Hankins, Young-Chan Suh, and B. Frank McCullough, describes the design of the experimental test sections to be used for the verification of a design standard. The design standard is one of the first to incorporate those various physical design features that account for the variety in concrete mix properties. March 1992.

Report No. 422/1244-2, "Characterization of Concrete Properties with Age," by Terry Dossey and B. Frank McCullough, presents the laboratory measurements of concrete properties for eight aggregates commonly used in Texas for pavement construction. A series of models are developed for predicting concrete property behavior, either directly from aggregate type or indirectly from chemical composition of the aggregate. March 1992.

Report No. 422/1244-3, "Early-age Behavior of CRC Pavement and Calibration of the Failure Prediction Model in CRCP-7," by Young-Chan Suh and B. Frank McCullough, presents (1) the observations and findings from the short-term monitoring of the special test sections constructed in Houston, Texas, and (2) the calibration of the CRCP failure prediction model in the CRCP-7 computer program. March 1992.

Report No. 422/1244-4, "Monitoring of Siliceous River Gravel and Limestone Continuously Reinforced Concrete Pavement Test Sections in Houston 2 Years After Placement, and Development of a Crack Width Model for the CRCP-7 Program," by Miguel Angel Otero Jiménez, B. Frank McCullough, and Kenneth Hankins, documents the design, construction, and monitoring of 32 test sections in Houston, Texas. Constructed to evaluate the performance of pavements built in accordance with the CRCP-89(B) design detail recently developed by TxDOT, these test sections were monitored to determine the field performance of CRCP 2 years after construction, looking in particular at crack spacings and crack width. As part of this study, a new model to be used with the CRCP-7 program—one capable of predicting crack widths—was developed. March 1992.

ABSTRACT

In describing the effect of coarse aggregate type on the performance of CRCP, this report documents the design, construction, and monitoring of 32 test sections in Houston, Texas. Constructed to evaluate the performance of pavements built in accordance with the CRCP-89(B) design detail recently developed by TxDOT, these test sections were monitored to determine the field performance of CRCP 2 years after construction, looking in particular at crack spacings and crack width. Then, using the observed performance of the different coarse aggregates, the study team evaluated the recently developed CRCP-89(B) design detail. Finally, using the CRCP-7 computer program, the predicted performance was compared with the measured performance of the CRCP test sections. Based on this comparison, a new model to be used with the CRCP-7 program—one capable of predicting crack widths—was developed.

KEY WORDS: CRCP, coarse aggregates, siliceous river gravel aggregates, limestone aggregates, CRCP-7 computer program, CRCP89(B) design detail, pavement behavior, crack spacing, crack width, pavement temperature.

SUMMARY

Based on a review of 32 test sections constructed at four different project sites in Houston, Texas, this report documents the performance of continuously reinforced concrete pavements (CRCP) up to 2 years after construction. Specifically, the test sections were designed to study how CRCP performance is affected by (1) coarse aggregate type, (2) quantity of reinforcing steel, (3) amount of steel bond area, and (4) pavement thickness. Toward this end, test section monitoring included measurements of crack spacing, crack width, and concrete slab temperatures—all collected during the early age of the test sections (i.e., before construction and up to 1 month after construction) and for 2 consecutive years following construction. The construction itself was scheduled so that the seasonal effects on CRCP performance could also be studied.

Using the data collected over the 2 years, along with the data previously collected in the early-age monitoring, the study team developed a model to predict crack width based on the day of crack occurrence. This model is designed to be used with the CRCP-7 computer program, a software program devised several years ago to predict CRCP performance from an empirical/theoretical standpoint. While early versions of the program predicted average transverse crack spacing and crack width (in addition to predicting the steel stress in the reinforcement), later improved versions include a model to estimate the crack spacing frequency. Using field measurements of crack width sizes, the project team developed the new prediction model to modify the existing model.

The primary objectives of this study were to (1) document the field performance of continuously reinforced concrete pavements constructed with different coarse aggregates (siliceous river gravel and limestone) in the early life of the pavement (1 and 2 years after construction) in terms of crack spacings and crack widths, (2) evaluate the recently developed CRCP-89(B) design detail for calculating the reinforcing steel for continuously reinforced concrete pavements, and (3) compare the measured crack spacing and crack width parameters with the values predicted by the CRCP-7 program. In addition, two models were developed: (1) a model to calculate concrete pavement temperatures based on air temperatures reported by the U.S. Weather Bureau, and (2) a model to predict crack widths for CRCP based on concrete properties and climate data.

IMPLEMENTATION STATEMENT

The evaluation of the recently developed CRCP-89(B) design detail provided in this report yields a better understanding of the effect of different coarse aggregates on the performance of CRCP, which in turn can lead to better reinforced steel designs for these pavements. In addition, by comparing the pavement performance predicted by the CRCP-7 computer program with the measured values of the Houston test sections, the study team has modified the crack width model to better predict this performance parameter.

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CHAPTER 1. INTRODUCTION

BACKGROUND

Coarse aggregate, because it makes up 60 to 80 percent of the concrete mix volume, has a significant influence on mix properties. This influence is such that pavements constructed with different coarse aggregate types exhibit substantial variations in both their performance and their associated pavement distresses, as demonstrated by various condition surveys (Refs 1-3) conducted in Texas on continuously reinforced concrete pavements (CRCP). Thus, while CRCP has been successfully designed and constructed since the 1960s, the effect of the variation in coarse aggregate types on the performance of CRCP has not been fully recognized in the design-construction process.

In addressing this issue, a 1987 study by Green (Ref 4) suggested that the properties of concrete may be used to differentiate the performance of CRCP. These properties, investigated in terms of coarse aggregate, included compressive strength (f_c), splitting tensile strength (f_t), elastic modulus (E), drying shrinkage (Z), and thermal coefficient (α). Since specifications generally require a mix design to meet a given strength standard, only the latter properties—elastic modulus, drying shrinkage, and thermal coefficient—were found to vary with the coarse aggregate type. Eight different coarse aggregate types (representing a range of suppliers in Texas) were investigated, although the study recognized that the coarse aggregates most commonly used in Texas are limestone (LS) and siliceous river gravel (SRG).

Using the aggregate properties identified by Green, the Texas Department of Transportation (TxDOT) developed a new CRCP-89(B) design detail (Appendix A) that ensures that alternative pavement designs using different coarse aggregates will provide equivalent pavement performances. Assuming that performance is a function of crack spacings, the analysis procedure includes steel reinforcement details that produce similar crack spacings (in place of pavement thickness variation) as a function of aggregate type (Refs 5-7).

To evaluate this TxDOT design standard, the Center for Transportation Research (CTR) of The University of Texas at Austin monitored 32 test sections on 4 different projects constructed in Houston, Texas. The study variables included coarse aggregate type, concrete thickness, percentage of steel, bond area of reinforcing bar, and the season in which construction occurs. The test sections were observed and the data were analyzed—as reported by Suh (Ref 8)—during the early age (first 30 days after construction) of the concrete pavement. This report, then, is a CTR follow-up study that analyzes the pavement's performance for up to 2 consecutive years after construction of the test sections.

In addition, this report evaluates the CRCP-7 computer program, a mechanistic model developed by CTR to predict the performance of CRCP in terms of crack spacing (mean and distribution), crack width, steel-stress history, and punchout development. This program is the most recent version of a series of programs used over the past 15 years by TxDOT to develop CRCP design details.

While a proper evaluation of the CRCP-7 program would require monitoring the pavement over its entire service life (considered impractical), the study team chose to look at CRCP performance only during the first 2 years of the pavement's service life; it is the thesis of this investigation that if the desired crack pattern can be achieved during the first year, then the probability of the pavement achieving its design life is increased substantially.

OBJECTIVES

The 32 test sections were constructed in Houston to evaluate the performance of pavements built in accordance with the CRCP-89(B) design detail. Using this as a starting point, the project team further divided the study into the following subordinate objectives:

(1) to document the field performance of CRCP for up to 2 years following construction, focusing

particularly on crack spacings and crack widths;

(2) to evaluate the recently developed CRCP-89(B) design detail using the observed performance of the different coarse aggregates; and

(3) to suggest modifications of the CRCP-7 computer program based on a comparison of the predicted performance and the measured performance of the CRCP test sections constructed in this project.

SCOPE

This report presents the findings, recommendations, and revisions derived from the 32 CRCP test sections monitored for up to 2 years after construction. While this chapter has described the problem and objectives undertaken in this study, Chapter 2 documents the specific study methodology used to monitor, evaluate, and predict test section behavior. Next, having identified concrete temperature as a significant variable in concrete behavior, Chapter 3 introduces a procedure to estimate concrete set temperature based on the heat of hydration, and another procedure for developing an equation to calculate pavement concrete temperatures based on measured air temperatures.

Chapters 4 and 5 discuss the findings from those test sections monitored during the first and second years after construction, with emphasis on crack spacing and crack width. Chapter 6 introduces the development (based on the findings) of an improved crack width model for the CRCP-7 computer program.

Finally, Chapter 7 summarizes observations and findings, while Chapter 8 presents the conclusions and recommendations of this study.

CHAPTER 2. STUDY METHODOLOGY

INTRODUCTION

This chapter describes the three principal aspects of the study methodology: concept of analysis, data collection, and behavior prediction.

CONCEPT OF ANALYSIS

Although pavement performance is generally a function of space and time, the performance of a given pavement is a function of its material variability and its loading history. A better and more uniform material (i.e., one having lower material variability) produces a lower number of failures and, hence, a better performance. On the other hand, a more heavily loaded pavement develops deterioration faster, which results in a poorer performance.

Pavement performance is a function of ride quality, evaluated in terms of the present serviceability index (psi). Unlike flexible pavements, CRCP shows an almost constant psi up to the point at which it experiences about three punchouts per lane per year (the condition that defines structural failure). A sharp reduction in psi then occurs until the pavement reaches a psi value of 2.5. Thus, pavement performance for CRCP is a function of the cumulative punchouts over a given period of time.

Accordingly, the controlling variable in the performance prediction of CRCP is the number of punchouts, and, for a given pavement, the generation of punchouts can be predicted as a function of crack spacing, crack width, and steel stress. If after one year these variables are controlled, the pavement performance over its design life will most likely be satisfactory. (The failure mechanism of punchouts as a function of crack spacing is described in Chapter 4, while the effect of wide crack widths on the failure mechanism is described in Chapter 5.)

Finally, high steel stresses (another analysis concept used in this study) will cause reinforcing steel to yield. Characteristic of this breakdown are (1) a reduced cross section of the reinforcing steel and (2) wide cracks promoting the wide crack failure mechanism.

BEHAVIOR VARIABLES

This section presents (1) the experiment design for the controlled variables, and (2) the uncontrolled variables that can affect the results of the experiment.

Experiment Design for Controlled Variables

Controlled monitoring of the CRCP test sections involved verifying the performance of the recommended CRCP-89(B) design detail in terms of the following variables:

(1) coarse aggregates (2 levels);
(2) longitudinal reinforcing steel percentages (3 levels);
(3) available bond areas (2 levels);
(4) concrete slab thicknesses (3 levels); and
(5) seasons of placement (2 levels).

Analyzing all possible combinations required 72 test sections. Study personnel addressed the first three variables by using eight test sections at each project location, as shown in Table 2.1.

Table 2.1 Experiment design of each test section used on each project location to consider aggregate type, percent steel, and bond area

	Coarse Aggregate Type	SRG			LS		
	% Steel	Low	Medium	High	Low	Medium	High
Bond area	High	C	B	A	F	G	H
	Low		D			E	

Two different coarse aggregate materials were studied: (1) siliceous river gravel (SRG) in test sections A, B, C, and D, and (2) limestone (LS) in test sections E, F, G, and H. Three reinforcing steel percentages were studied, including (1) the percentage recommended by the design detail (hereafter medium steel) in test sections B, D, E, and G; (2) a percentage 0.1 percent higher than that recommended by the design detail (hereafter high steel) in test sections A and H; and (3) a percentage 0.1 percent lower than that recommended by the design detail (hereafter low steel) in test sections C and F. Two different bond areas were studied using two different reinforcing steel bar diameters: (1) a #6 bar (3/4 inch) in test sections A, B, C, F, G, and H; and (2) a #7 bar (7/8 inch) in test sections D and E (see Ref 9).

All projects were divided into eight test sections, each 230 feet long and each having a 200-foot analysis zone and a 15-foot transition zone on each end. The project layout is shown in Figure 2.1.

Thirty-two test sections were placed in four project construction sites to account for the last two controlled variables in the experiment design, as shown in Table 2.2. The first project, 11 inches thick, was constructed June 16–19, 1989, on State Highway 6 near Huffmeister Road (SH 6S). The second project, 10 inches thick, was constructed November 24–25, 1989, on Beltway 8 (BW 8). The third project, also 11 inches thick, was constructed January 10–12, 1990, on State Highway 6 near Patterson Road (SH 6W). The fourth project, 15 inches thick, was constructed January 14–21, 1990, on Interstate Highway 45 (IH-45). These project locations are shown in Figure 2.2.

Table 2.2 Study experiment design used to expand project experiment to consider pavement thickness and season of placement

	Pavement Thickness (in.)	10	11	15
Placement season	Winter	BW 8	SH 6W	IH-45
	Summer		SH 6S	

The season of placement affects pavement performance in that the temperature-induced stresses will vary with time of placement, air temperature, and heat of hydration (as explained in Chapter 3). Table 2.3 shows the average temperature history of the projects' concrete pavements.

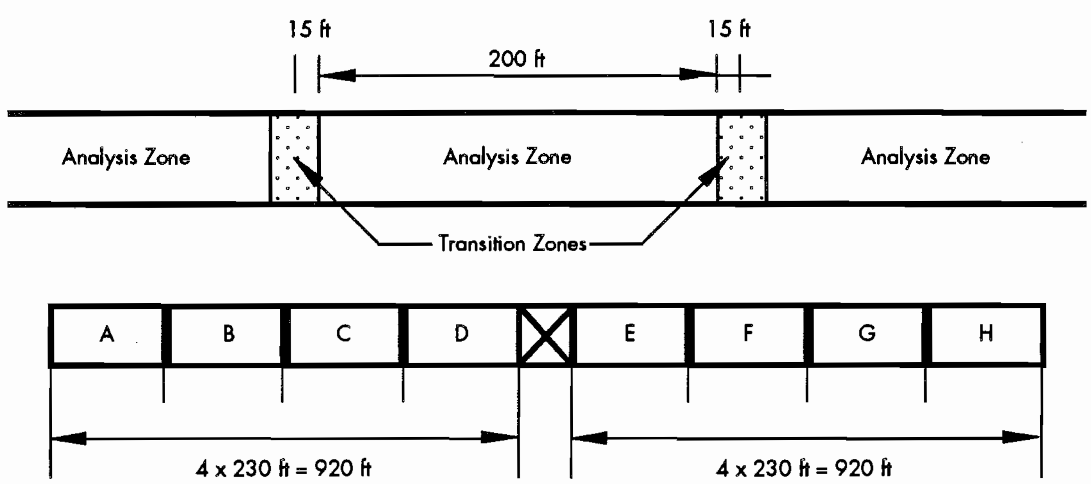

Figure 2.1 Layout of the project test sections

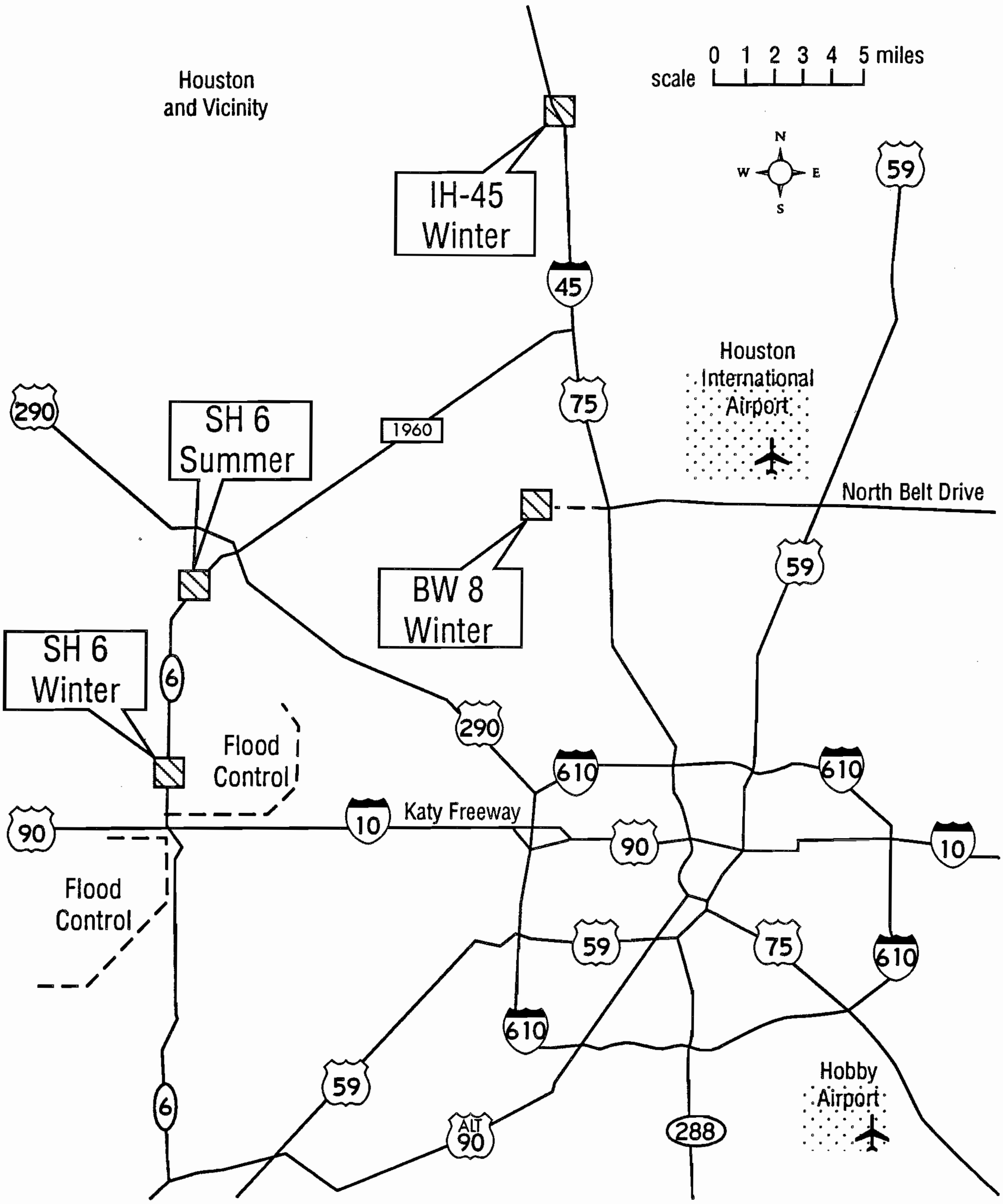

Figure 2.2 Location and season of placement of the projects

Uncontrolled Variables

This section describes the uncontrolled variables that affected pavement performance in the field experiment. These variables included pavement structure, reinforcing steel location, construction variability, temperature, manholes, and material properties.

Pavement Structure: The pavement structure, the same for all the projects, consisted of a CRCP surface course (different thicknesses for each project as described previously), 1 inch of asphalt-stabilized base (as a stress-relief course), 6 inches of cement-treated base, and 6 inches of lime-treated roadbed soil over a clay roadbed soil.

Reinforcing Steel Location: The longitudinal reinforcing steel was placed at the slab's mid-depth in a single mat for all projects except IH-45, which, being 15 inches thick, had the steel placed in two layers equally spaced from the center (each 2.5 inches from mid-depth).

Construction Variability: It should be noted that the two test sections on State Highway 6 were constructed by the same contractor, although in different seasons (winter and summer). Comparing these two test sections demonstrated the influence of placement season on pavement performance.

Temperature: Since temperature has a significant impact on crack widths, a concrete block containing embedded thermocouples was installed at each construction site. The block, placed at the site on the night before the measurements were to be taken, was covered by earth on the lateral sides. After the temperature was recorded over different time intervals, an estimate of the temperatures at each test section was incorporated into the study of crack widths. The recorded measurements included air temperature and block temperature at the top, middle, and bottom portions of the block. (The top thermocouple is located 1 inch from the surface of the block; the middle thermocouple is located in the center of the block; and the bottom thermocouple is located 1 inch from the bottom of the block—see Ref 8.)

Manholes: The project placed on SH 6S had manholes in the center of the lane for both SRG and LS test sections. Because they were thought to have adversely affected the performance of the CRCP test sections, the manholes were observed during the monitoring process.

Material Properties: The principal concrete properties that vary with coarse aggregate type are compressive strength (f_c), splitting tensile strength (f_t), elastic modulus (E), thermal coefficient (α), and drying shrinkage (Z). An extensive laboratory study (Ref 10) was performed to determine the properties for each project using different coarse aggregates. Tables 2.4 and 2.5 show the laboratory results 28 days after curing.

Table 2.3 Average temperature history of the projects (°F)

	SH 6S	SH 6W	BW 8	IH-45
Set temperature	102.6	71.0	74.0	74.1
Minimum temperature (°F) 24 hours after construction	96.5	61.5	73.4	68.0
Minimum temperature (°F) 28 days after construction	72.0	45.2	34.6	45.2
Minimum seasonal temperature (°F)	25.0	37.0	25.0	37.0
Days to minimum seasonal temperature	180	360	30	350

Table 2.4 Physical properties of the concrete placed at the projects 28 days after construction using SRG

	SH 6S	SH 6W	BW 8	IH-45
Compressive strength (f_c) (psi)	6,252	5,535	5,567	5,273
Splitting tensile strength (f_t) (psi)	600	554	558	465
Elastic modulus (E), psi (x 10^{-6})	5.40	5.49	4.68	5.50
Thermal coefficient (α), in./in./°F (x 10^{-6})	5.5	6.6	8.4	6.6
Drying shrinkage (Z), in./in. (x 10^{-5})	20.9	11.5	24.5	18

Table 2.5 Physical properties of the concrete placed at the projects 28 days after construction using LS

	SH 6S	SH 6W	BW 8	IH-45
Compressive strength (f_c) (psi)	7,372	6,747	5,886	7,095
Splitting tensile strength (f_t) (psi)	497	556	478	572
Elastic modulus (E), psi (x 10^{-6})	5.53	5.39	4.14	5.01
Thermal coefficient (α), in./in./°F (x 10^{-6})	3.1	3.8	5.5	4.1
Drying shrinkage (Z), in./in. (x 10^{-5})	16.0	16.5	11.0	16.0

MEASURING BEHAVIOR VARIABLES

The performance of CRCP is closely related to three parameters: crack spacing, crack width, and steel stress. The first two were monitored at the test sections during initial placement, and then for 2 consecutive years after construction.

Crack Spacing

The study team measured crack spacings with a roll-a-tape, recording at the same time each crack's location at the edge of the pavement. The difference between these measurements represented the recorded crack spacing. (It should be noted that no correction was made for meandering cracks.)

Crack Width

The crack widths were measured with a microscope having a scale of 0.001-inch gradations and a resolution of x60. In the early behavior monitoring, eight to ten cracks were randomly selected at each test section (see Ref 8). When possible, three measurements were taken at each of these cracks, with the location for a measurement along a crack chosen and designated as the representative crack width (see Figure 2.3). The microscope was then brought onto the pavement to obtain a viable reading. Again when possible, the microscope was focused on the crack to measure obvious adjacent edges (about 1 inch deep), a technique used to ensure that actual crack width—and not superficial spalling—was being measured. Typically, three measurements were made at each crack in the same location as used for the early behavior monitoring (see Ref 8), and at three randomly selected new crack locations in each test section.

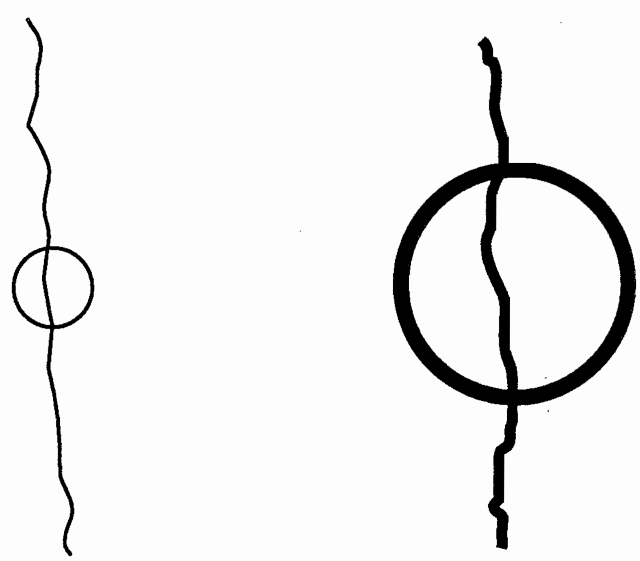

Figure 2.3 Conceptual representation of crack width measurement location

Steel Stress

Although steel stress was not monitored in this study, no distress was found to be associated with steel yield during the monitoring of the test sections.

PREDICTING BEHAVIOR

Because the CRCP-7 program is capable of predicting the performance of continuously reinforced concrete pavements based on crack spacing, crack width, and steel stress, the program may be evaluated by comparing predicted versus monitored variables (crack spacing and crack width; no provision was made for measuring steel stress). Using the data collected in the early behavior monitoring (Ref 8), along with the data collected in this research, the study group completed a short-term study whose fundamental hypothesis—that a successful prediction of crack spacing and crack width improves the probability of predicting long-term performance—was verified for up to 2 years after construction.

CHAPTER 3. CONCRETE PAVEMENT TEMPERATURE

One of the significant variables affecting the behavior of CRCP is the concrete temperature history recorded over the pavement's life (Refs 8, 11-16). The concrete temperature history can be characterized by three periods:

(1) the concrete set temperature (which is affected by the heat of hydration) at which concrete transforms from a plastic to a solid state;
(2) the daily concrete temperature cycle, especially the minimum daily concrete temperature (before the concrete gains full strength); and
(3) the seasonal concrete temperature cycle, especially the minimum yearly concrete temperature.

The concrete set temperature is defined as the temperature at which concrete solidifies through curing (no longer in a plastic state). At this point, the concrete is capable of resisting compressive or tensile stresses. Daily and seasonal concrete pavement temperature cycles are shown in Figure 3.1.

Through chemical reactions occurring during cement hydration, energy in the form of heat is released from a fresh concrete mix. Following 1 to 2 hours of dormancy, the concrete experiences a sharp temperature increase over the next several hours. This temperature increase is defined as the heat of hydration, and the transition of the concrete mix from a plastic to a solid state occurs during this time. (For a discussion of how to measure the heat of hydration of concrete, see Ref 8.) Figure 3.2 presents a schematic representation of the heat of hydration versus time.

The magnitude and the rate of the heat of hydration is a function of the initial concrete placement temperature. The heat of hydration will peak higher and more quickly for a high placement temperature than for a lower placement temperature. Figure 3.3 shows the effect of placement temperature on heat of hydration (Refs 20 and 21).

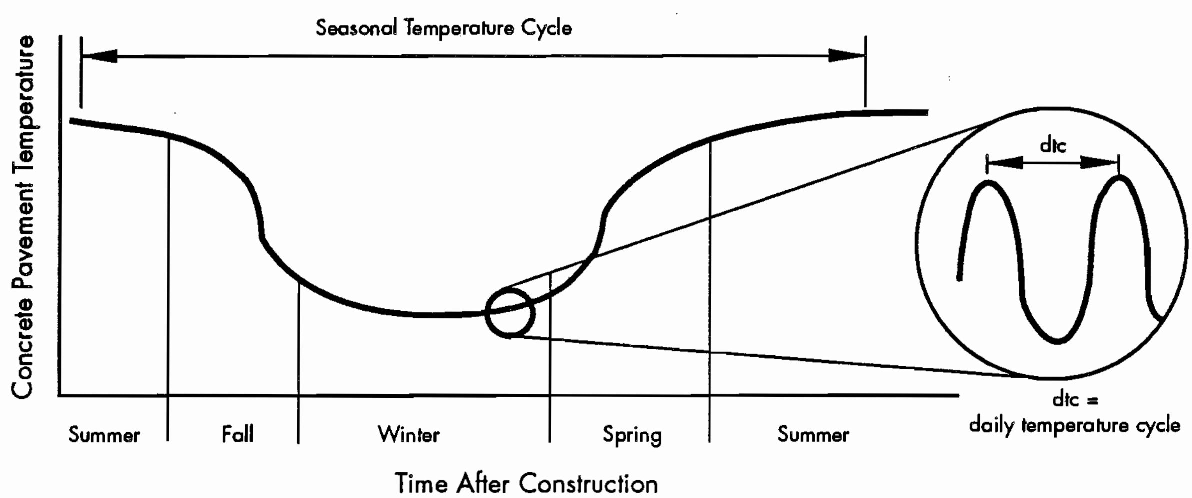

Figure 3.1 Schematic concrete pavement seasonal and daily temperature cycles

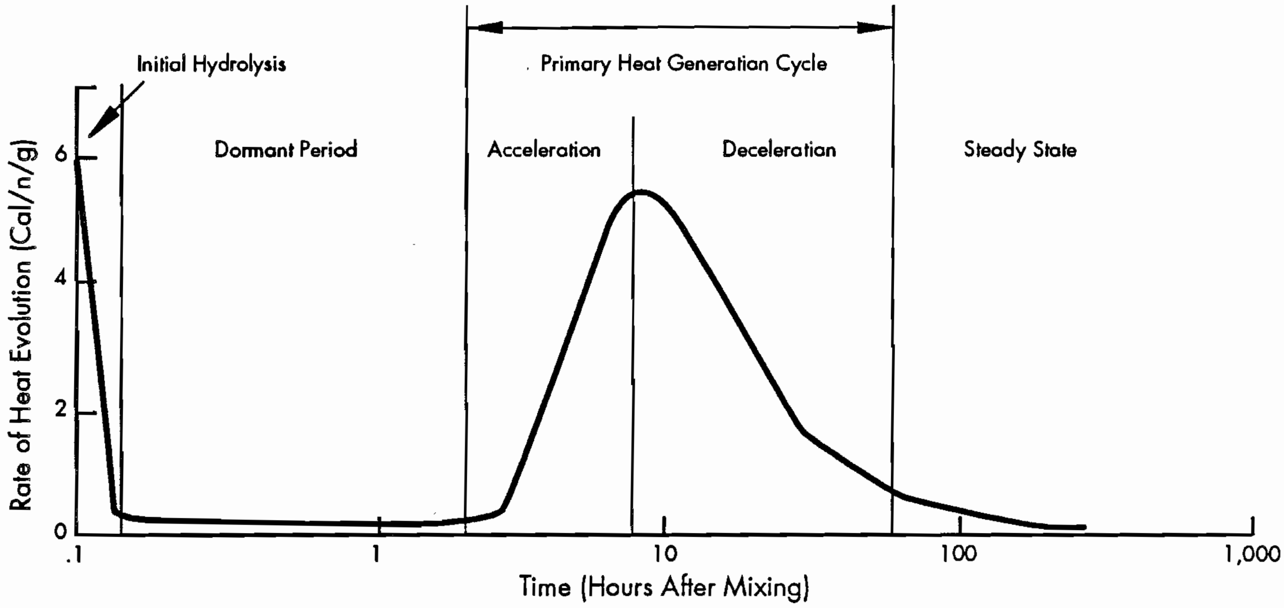

Figure 3.2 Schematic representation of the heat of hydration versus time on concrete tricalcium silicate (Ref 18)

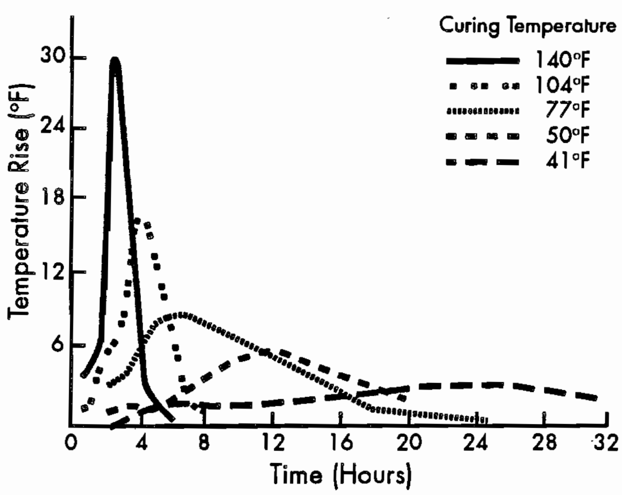

Figure 3.3 Effect of placement temperature on concrete heat of hydration (modified from Ref 19)

To estimate the set temperature, the following procedure is proposed:

(1) Enter the concrete placement temperature on the vertical axis of Figure 3.3 and read the temperature increase caused by heat of hydration (interpolate when necessary).
(2) Read the time after placement from the horizontal axis when the temperature increase is highest for the given condition.
(3) Add the temperature increase caused by heat of hydration from step (2) to the concrete placement temperature and to the concrete temperature at the maximum heat of hydration.
(4) Divide the total of step (3) by 2.

Be aware, however, that this procedure, given only as a reference, has not been verified. Further research is needed to assure its accuracy.

Since concrete temperature is highly dependent on air temperature, study personnel next investigated the correlation between temperatures recorded by the U.S. Weather Bureau and the measured slab temperatures. The data collected on the day of placement were neglected to avoid the influence of the heat of hydration. Typical measured concrete pavement and air temperatures are presented in Figure 3.4.

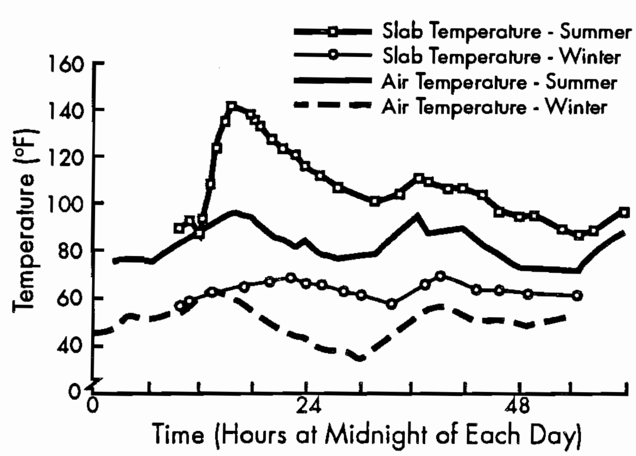

Figure 3.4 Typical measured concrete pavement and air temperatures

In the same way, a user can obtain data from a local weather bureau station to estimate the required temperature data for the CRCP-7 program when measured concrete temperatures are not available. This correlation may be used to calculate both the minimum daily concrete temperature and the minimum yearly concrete temperature.

The following regression correlation (Equation 3.1) was developed from data collected during the early-age monitoring (excluding the first 24 hours after placement to avoid any influence by the heat of hydration). The data collected from the monitoring of each section for up to 2 years after construction could not be used because there were no data available from the U.S. Weather Bureau. The data used to develop the correlation equation can be found in Appendix C.

$$T_c = 20.2 + 0.758\ T_a \quad (3.1)$$

where:

T_c = concrete temperature at the top of the slab (°F), and
T_a = air temperature measured by nearest weather station (°F).

The correlation was developed using concrete temperatures at the top of the slab (thermocouple embedded 1 inch into the slab) instead of in the center of the slab, since they had a better fit (R^2 = 0.873). The temperature at mid-depth becomes equal to the temperature at the top of the slab within a few hours. It should be noted that because the temperature range for the data set varies from 30°F to 90°F, extrapolations outside this range should be checked for accuracy. Figure 3.5 presents the measured concrete temperature as a function of the measured air temperature using the data and the regression line defined by Equation 3.1. The temperature used in the equation should be rounded to the nearest full degree to match the accuracy of the measured U.S. Weather Bureau data.

In summary, concrete temperature history used for the purpose of CRCP-7 computations can be characterized by the following: (1) concrete set temperature, (2) daily concrete temperature cycle, and (3) seasonal concrete temperature cycle. This chapter has introduced procedures that estimate concrete set temperatures based on heat of hydration and estimate pavement concrete temperatures based on measured air temperatures.

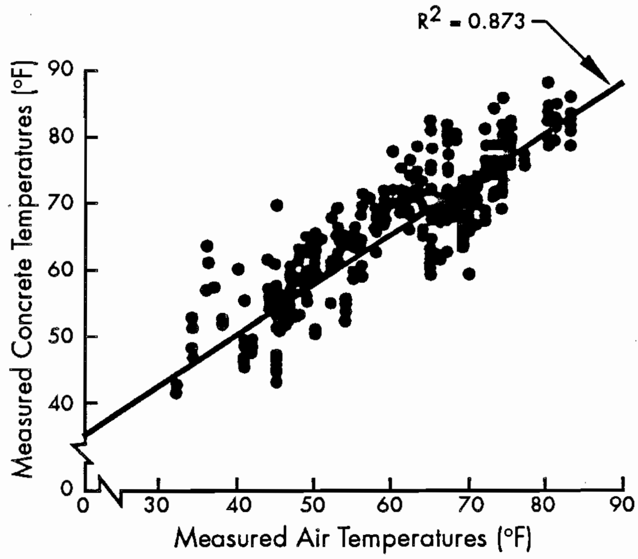

Figure 3.5 U.S.-Weather-Bureau-measured air temperatures versus measured concrete pavement temperatures from CRCP test sections in Houston, Texas

CHAPTER 4. CRACK SPACING

INTRODUCTION

This chapter discusses the crack spacing measurements collected from the test sections and presents a comparison of the predicted versus measured crack spacing behavior of the test sections.

SUMMARY OF EARLY-AGE OBSERVATIONS

In conducting early-age (first 30 days after construction) monitoring of the test sections, Suh and his study team (Ref 8) concluded the following:

(1) For the paired (equivalent) test sections, there was a significant difference in crack spacing between the siliceous river gravel (SRG) and the limestone (LS) sections. The LS sections, without exception, experienced fewer cracks and larger crack spacings than the SRG sections.
(2) In the winter projects, the crack spacing generally decreased as the percent steel increased. At 1 month, a change in bond area achieved by the use of different bar sizes (No. 6 and No. 7 bars) did not yield a significant difference in crack spacing.
(3) The CRCP program reliably predicted crack spacing (both mean crack spacings and crack spacing distribution) occurring during early life.

FAILURE MECHANISM

AASHTO guidelines (Ref 23) recommend that crack spacings remain in the 3.5- to 8-foot range. While the upper crack spacing limit was selected to avoid high stresses in the reinforcing steel, the 3.5-foot lower limit is equally critical, insofar as a closer crack spacing will cause the pavement to distribute the load in the transverse direction only. In such a case, the pavement acts as a transverse beam; that is, the pavement fails to transmit the load in both the transverse and longitudinal directions, as would be expected of a slab. This condition can cause a failure in the pavement known as a punchout, a structural failure in which a small segment of the pavement is completely separated from the rest of the structure. Representing the most severe distress manifestation found in CRC pavements, punchouts are generally bound by two closely spaced transverse cracks and two longitudinal cracks.

Under heavy traffic loads, high slab deflections may cause excessive spalling, loss of aggregate interlock, and, eventually, excessive transverse tensile stress. Excessive transverse tensile stress and cumulative load fatigue eventually cause a longitudinal crack to form between the two transverse cracks. The closer the transverse cracks, the higher the longitudinal tensile stress, and, therefore, the higher the probability of a punchout (Ref 22). The failure mechanism of a punchout can be seen in Figure 4.1, in which the tensile stresses at the bottom of the slab, owing to wheel loads, are schematically shown by arrows. The lengths of the arrows are relative indicators of the stress magnitude. Note in particular the higher transverse stresses with small crack spacings. The punchout mechanism and its rate of occurrence is compounded by a loss of support, which may be caused by a softening of the base material by percolated water, material pumping, or other similar actions.

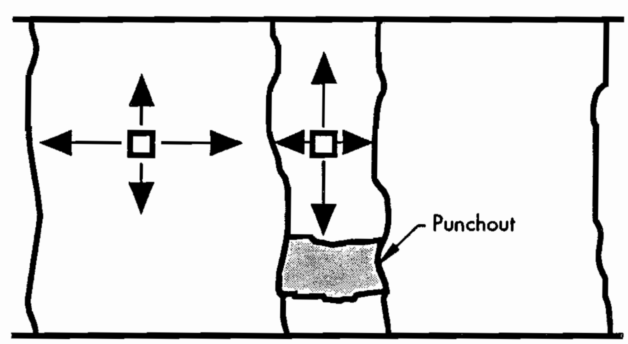

Figure 4.1 Schematic punchout failure mechanism

ANALYSIS OF BEHAVIOR MEASUREMENTS

This section presents results from the monitoring of test sections using crack spacing averages, standard deviations, and crack spacing distribution.

Behavior Parameters

Crack spacings for the four projects (32 test sections) were observed for each of 2 years following construction (1.5 years for the SH 6 summer construction test section). Other than some unusual distress at the manholes on SH 6S, no punchouts, failures, or patches were noted on any of the test sections. Some minor spalling was evident along the transverse cracks on the SRG sections of SH 6S. The size of the spalls (approximately .25 to .50 inch in length) had not increased since early-age observations.

Average Crack Spacing

Crack spacings for the test sections were monitored, as described in Chapter 2 (locations of the cracks are shown in Appendix D). Tables 4.1 and 4.2 show the measured average crack spacing and coefficient of variation values, respectively.

Figures 4.2 and 4.3 present the measured average crack spacings and the crack spacing standard deviation for the test sections, respectively.

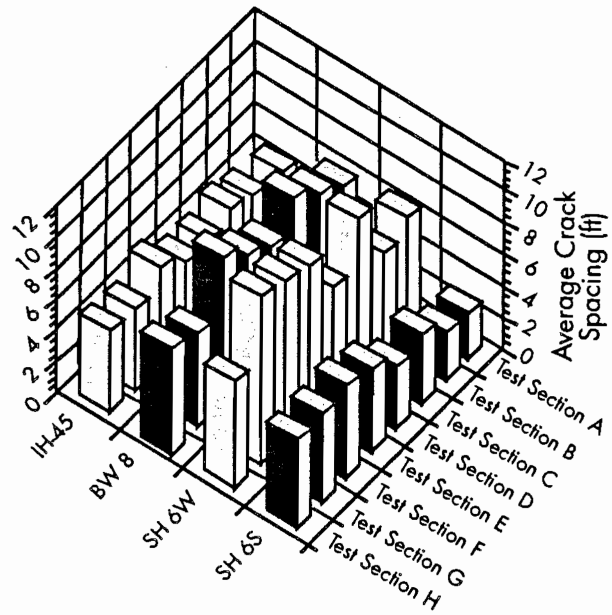

Figure 4.2 Measured average crack spacing of the Houston CRCP test sections by project location

Table 4.1 Measured average crack spacing (feet) of the Houston CRCP test sections by project location

	SRG				LS			
	Section A	Section B	Section C	Section D	Section E	Section F	Section G	Section H
SH 6S	2.62	3.03	4.39	3.90	5.37	5.81	5.54	5.59
SH 6W	6.11	5.59	9.26	6.48	9.65	10.13	10.95	7.00
BW 8	6.03	7.07	8.32	6.91	7.86	9.01	5.86	6.34
IH-45	4.29	4.33	4.97	4.47	4.82	6.04	4.99	5.16

Table 4.2 Crack spacing coefficient of variance of the Houston CRCP test sections by project location

	SRG				LS			
	Section A	Section B	Section C	Section D	Section E	Section F	Section G	Section H
SH 6S	73	59	73	72	60	64	56	75
SH 6W	64	63	53	69	38	34	36	63
BW 8	56	51	58	51	39	47	55	44
IH-45	77	60	52	67	58	55	54	60

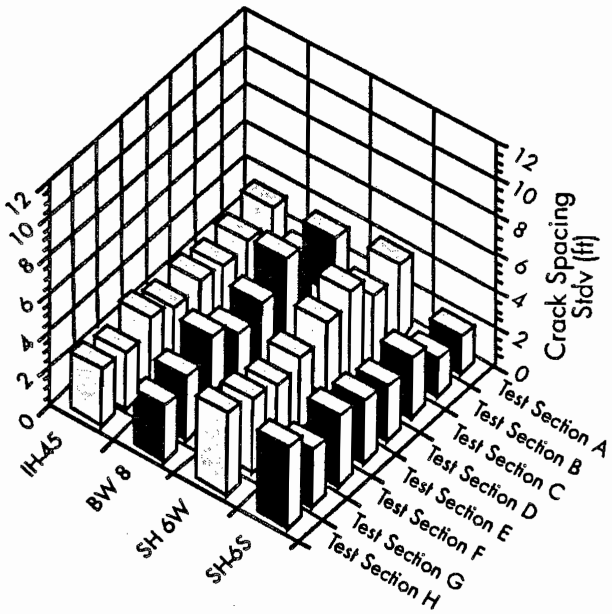

Figure 4.3 Measured crack spacing standard deviation of the Houston CRCP test sections by project location

Crack Spacing Distribution

To reduce the probability of punchouts or other failures, crack spacing distribution should fall within the previously mentioned 3.5- to 8-foot range. As seen in Figure 4.4, a "good" crack spacing distribution will generally fall inside the desired range, while a "poor" crack spacing distribution will fall outside that range.

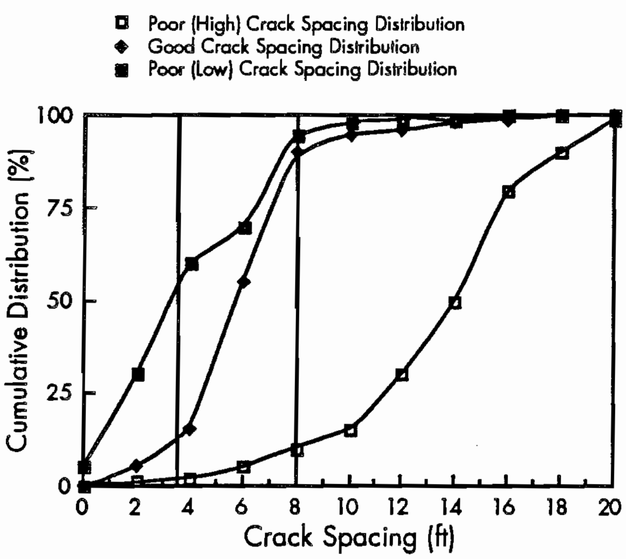

Figure 4.4 Conceptual crack spacing distribution for CRCP following the AASHTO guidelines

BEHAVIOR CONSIDERING CONTROLLED VARIABLES

This section discusses findings based on the monitoring of all test sections 2 years after construction. These findings involve the following controlled variables: coarse aggregate type, steel percentage, reinforcing steel diameter (bond contact area), season of placement, and slab thickness.

Coarse Aggregate Type

Normally, minimally sized crack spacing tends to be associated with SRG pavements (Refs 1-3). But since SRG has a coefficient of thermal expansion about 60 percent higher than that for LS, more cracking is expected. Here it should be mentioned that, of all the test sections, the LS sections contained a higher percentage of steel for the same design parameters (LS medium steel versus SRG medium steel). Thus, crack spacings on the test sections appear even closer than normal, since the CRCP-89(B) design detail was intended to produce equally spaced cracks for both coarse aggregate types.

Figure 4.5 presents a LS/SRG average measured crack spacing ratio by steel percentages and by project location. In this figure, it can be clearly seen that all but one of the LS test sections have a higher average crack spacing than the SRG test sections (though, in some cases, not significantly higher). For medium steel at BW 8, the crack spacing is lower for LS than for SRG.

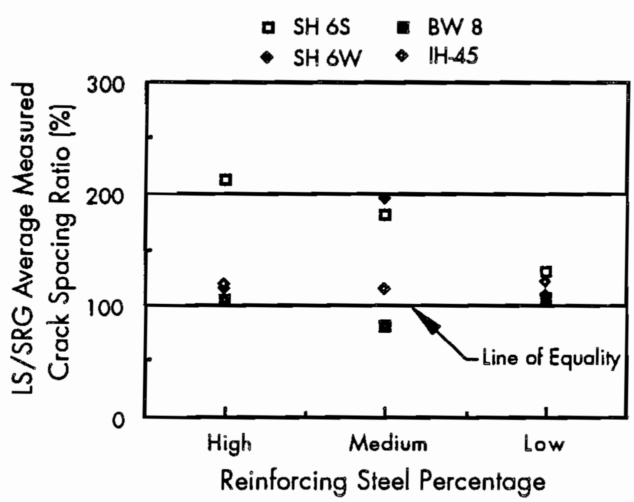

Figure 4.5 LS/SRG average measured crack-spacing ratio by steel percentages and by project location

All LS sections for SH 6S had an average crack spacing approximately double that of the SRG sections, with the smallest average crack spacing in medium steel. In this project location (SH 6S), extensive minor spalling (approximately .25 to .50 inch in length) was observed in the SRG test sections, and only limited spalling in the LS sections.

On the SH 6W project, the LS high steel test section had an average crack spacing approximately 17 percent higher than the equivalent SRG test section. For medium steel, the LS section had an average crack spacing about 80 percent higher than the equivalent SRG section, and the low steel sections had a similar average crack spacing. For the No. 7 bars, the LS section showed an average crack spacing 50 percent higher than the equivalent SRG section. As on other projects, researchers found some minor spalling in the SRG section at this project location, although only in a few cracks.

On the project at BW 8, the LS and SRG sections had, as expected, similar average crack spacings. The high steel test sections showed no significant difference. For the medium steel test sections, the SRG section had an average crack spacing about 16 percent higher than the equivalent LS section. For the low steel sections, LS had an average crack spacing 12 percent higher than SRG. For the No. 7 bars, the LS section showed an average crack spacing 15 percent higher than the SRG section. Minor spalling was found in this project, primarily in the SRG test sections.

Steel Percentage

One of the objectives of this experiment was to evaluate the effect of steel percentage on crack spacing. Figures 4.6 and 4.7 present the average measured crack spacings for the test sections by project location and by steel percentage for the SRG and LS test sections, respectively.

Note in the figures above that test sections C and F (0.1 percent less steel than was calculated by the design standard for SRG and LS coarse aggregates, respectively) have higher crack spacings than all the other test sections, except for LS on SH 6W, where section G (medium steel) had a slighter larger crack spacing. In general, it may be concluded that in order to obtain a large crack spacing, a lower steel percentage may be used. The upper limit for crack spacing is not a problem here, since most of the cracks fell below the upper limit and since no steel yield was evident in any of the test sections.

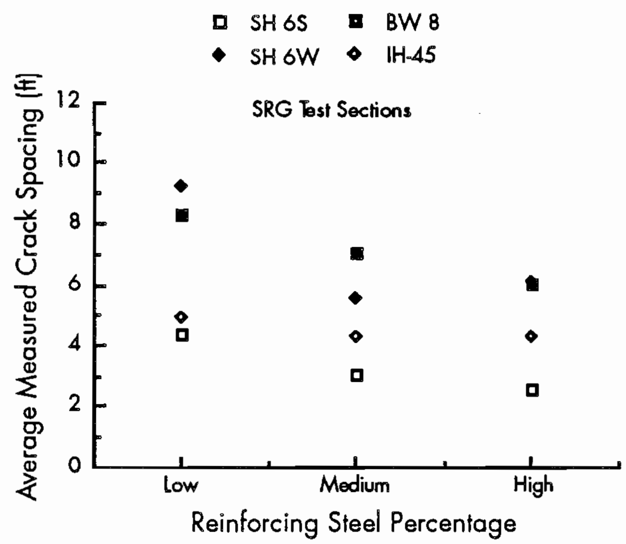

Figure 4.6 Average measured crack spacings for the SRG test sections by project location and steel percentage

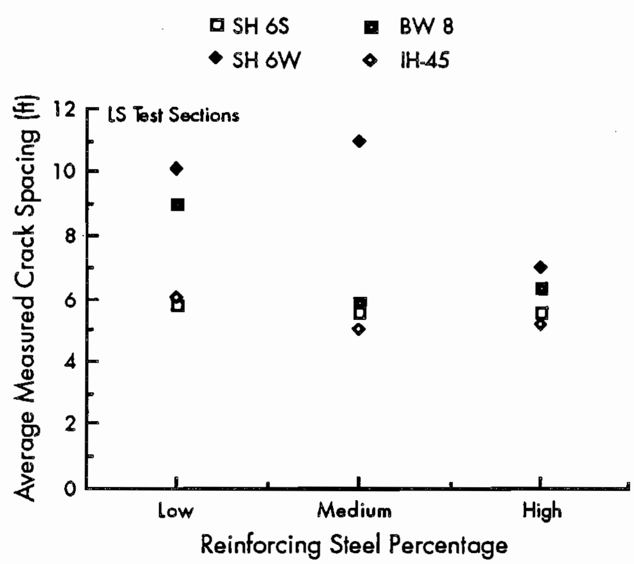

Figure 4.7 Average measured crack spacings for the LS test sections by project location and steel percentage

Bond Area (Reinforcing Steel Diameter)

Because a larger reinforcing steel diameter would result in a smaller area of contact between the concrete and the steel for the same steel percentage, it should be expected that a larger reinforcing steel bar diameter would yield larger crack spacings. Figures 4.8 and 4.9 present the average measured crack spacings for the test sections by project location and by reinforcing steel bar diameter for the SRG and LS medium steel test sections, respectively.

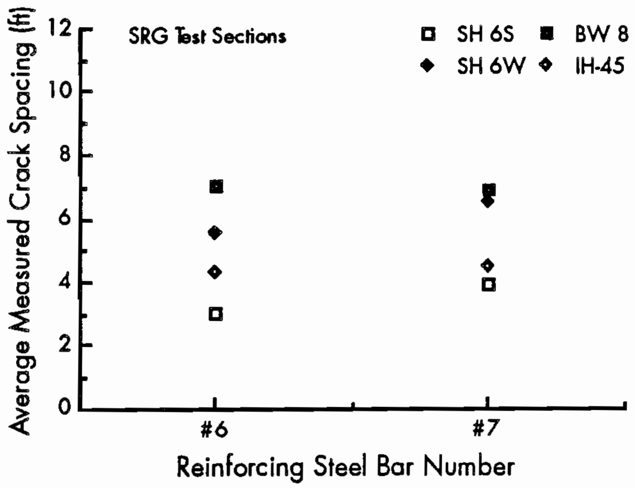

Figure 4.8 Average measured crack spacings for the SRG test sections by project location and reinforcing steel bar diameter

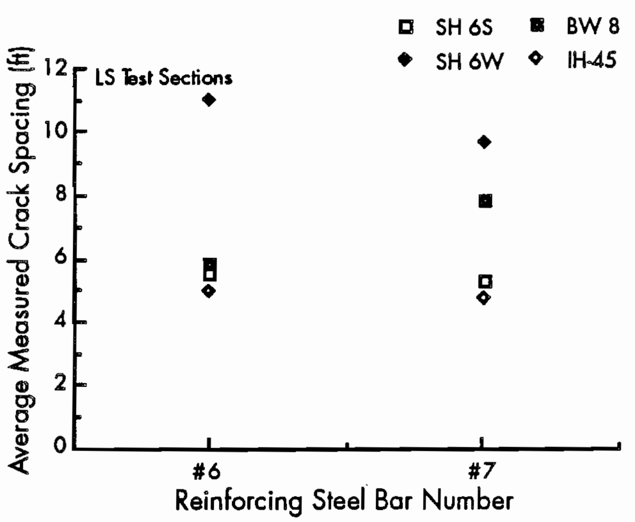

Figure 4.9 Average measured crack spacings for the LS test sections by project location and reinforcing steel bar diameter

On IH-45, the average crack spacing for sections with LS and No. 6 bars (sections F, G, and H) was about 15 percent higher than that for the equivalent SRG sections. The LS section with No. 7 bars shows no significant difference in average crack spacing when compared with the equivalent SRG section.

On the SH 6S project, the SRG test section with No. 6 bars had a lower crack spacing than the equivalent test section with No. 7 bars. However, the relationship was reversed for the LS section.

On the SH 6W project, the SRG test section with No. 6 bars had fewer cracks under the 3.5-foot limit than did the equivalent test section with No. 7 bars, although the latter had a higher number of cracks at a 1-foot spacing interval; thus, the behavior of the test section with No. 7 bars was similar to that of the section with No. 6 bars. Because the LS test sections with medium steel percentages (both No. 6 and No. 7 bars) had only one crack at the 3-foot spacing, the probability of punchouts is very low.

On the BW 8 project, the SRG test section with No. 6 bars had fewer crack spacings below the 3.5-foot lower limit than the equivalent test section with No. 7 bars. For LS, the test section with medium steel percentages and No. 6 bars had more cracks below the 3.5-foot limit than the equivalent test section with No. 7 bars (only three cracks under the 3.5-foot limit).

On the IH-45 project, the SRG test section with No. 6 bars and the equivalent section with No. 7 bars had a similar number of cracks under the 3.5-foot limit. However, the section with No. 7 bars had two concentrations of cracks under this 3.5-foot limit: one at a 1-foot crack spacing and the other at 3-foot crack spacings. Because the cracks at the 3-foot spacings were induced by the transverse reinforcing steel, it is difficult to assess which test section will yield a better performance, owing to the area of contact between the concrete and the reinforcing steel. The LS test section with No. 6 bars had fewer cracks below the 3.5-foot limit than did the equivalent test section with No. 7 bars, which therefore ranks it as a potentially better performer.

Season of Placement

A summer construction project has more cracks under the 3.5-foot lower limit than other projects. This difference can be explained by the large seasonal temperature differential that a summer project experiences from summer to winter, as opposed to other projects that are placed during much lower temperatures and which, therefore, experience lower set temperatures. Figure 4.10 presents the average measured crack spacings for the SH 6 test sections by placement season (project location) and by steel percentage for the SRG test sections.

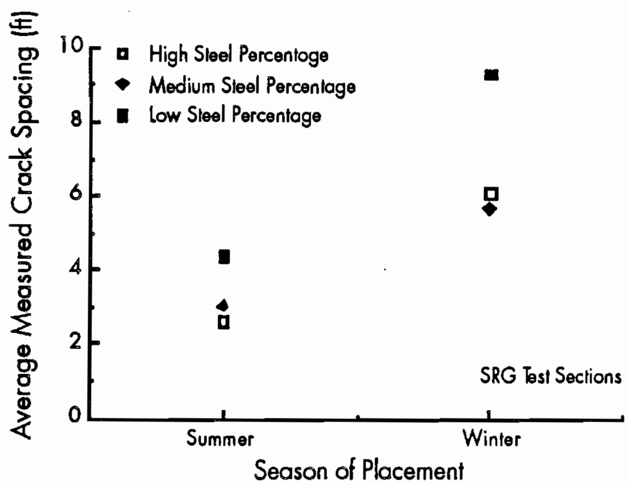

Figure 4.10 Average measured crack spacings for the SRG test sections by project location and reinforcing steel bar diameter

As can be seen in Figure 4.10, all SRG test sections placed in the summer have a much lower average measured crack spacing than equivalent test sections placed in the winter. The same relation applies to the LS test sections.

Slab Thickness

Current research suggests that concrete shrinkage is a function of slab thickness, and that this thickness may have an effect on crack spacing. Given a thicker slab and a lower exposed-area-to-volume ratio, a lower shrinkage can be expected. And because low shrinkage yields larger crack spacings, a thick slab should have large crack spacings. This relationship is not evident in the test sections and, in fact, appears to be inverted. As shown in Figure 4.11, the SH 6W project (11 inches thick) has the largest crack spacing, followed by BW 8 (10 inches thick) and then by IH-45 (at 15 inches thick, the thickest of all the test sections). This behavior may result from the use of the double layer of transverse steel, which had an effect on the crack spacing at the project constructed on IH-45; for the other two projects, the theoretical relationship can be seen.

Regarding the SRG high steel sections, IH-45 had the lowest average crack spacing, followed by BW 8 and SH 6W, both of which had similar average crack spacings. For SRG medium steel, IH-45 had the lowest average crack spacing, followed by SH 6W and BW 8. For SRG low steel, IH-45 had the lowest average crack spacing. BW 8 and SH 6W had similar average crack spacings, though much higher than those at the other test sections. For SRG with No. 7 bars, IH-45 again had the lowest average crack spacing, followed by SH 6W and BW 8.

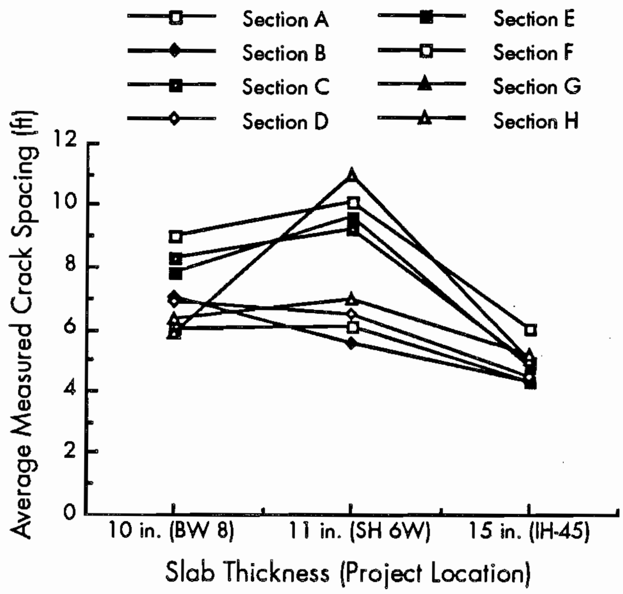

Figure 4.11 Average measured crack spacings by slab thickness and test sections

Average crack spacing in the LS high steel test sections, though somewhat similar, were ranked in the following ascending order: IH-45 (lowest), BW 8, and SH 6W (highest). For LS medium steel, IH-45 and BW 8 had similar average crack spacings, while SH 6W had a much higher average crack spacing. For LS with low steel, IH-45 had a low average crack spacing, with higher spacings from BW 8 and SH 6W. For LS with No. 7 bars, the IH-45 project had the lowest average crack spacing, followed by BW 8 and SH 6W.

BEHAVIOR CONSIDERING CRACK SPACING DISTRIBUTION

As previously described, crack spacing distribution has a significant impact on pavement performance. Crack spacing distribution is directly correlated with failure probability in a way that makes averaging misleading. For example, while a pavement's average crack spacing might be in the "safe" range (3.5 to 8 feet), that same pavement might have an excessive number of cracks under the 3.5-foot limit, which would increase the pavement's probability of failure. Figure 4.12 shows a typical crack spacing distribution; the distribution for the other test sections can be found in Appendix E.

SH 6S, having a large number of cracks below the 3.5-foot lower limit, had the poorest crack spacing distribution of all the projects; this was especially evident on section A, which had the poorest distribution of all the test sections. Both the SRG and the LS low steel test sections had the smallest number of cracks under the 3.5-foot limit, as would be expected. In general, the SRG test sections had a higher number of cracks under the 3.5-foot limit. The test sections with No. 7 bars for both SRG and LS had slightly fewer cracks below the 3.5-foot limit than did the test sections with No. 6 bars and equal steel percentages.

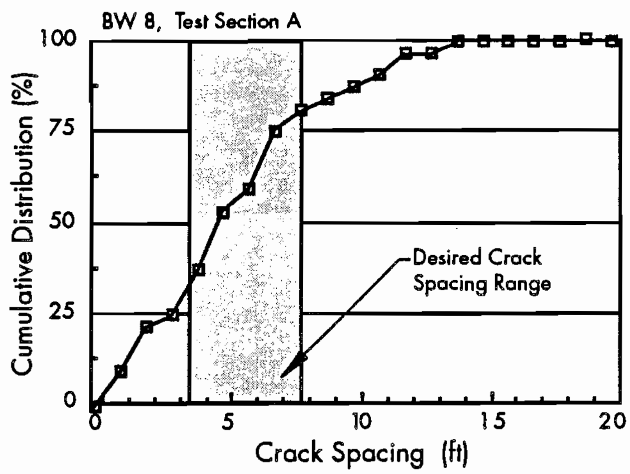

Figure 4.12 Crack spacing distribution for test section A (SRG high steel) at BW 8

At SH 6W, the SRG test sections had more cracks under the 3.5-foot limit, though still fewer than found at the SH 6S project. For the SRG and LS sections, the test sections with low steel had the fewest cracks under the 3.5-foot limit (as with the previous project). For the SRG section, the test section with No. 7 bars had slightly fewer cracks below the 3.5-foot limit than did the test section with No. 6 bars and an equal amount of steel. For the LS sections, both bar diameters behaved similarly, with only one crack found below the 3.5-foot limit.

Upon examination of the BW 8 project, it was found that the A and C test sections of SRG (high and low steel, respectively) had a similar number of cracks below the 3.5-foot limit; section B (medium steel with No. 6 bar) had fewer cracks below the 3.5-foot limit. Of the test sections containing LS, sections E and F had the fewest cracks under the 3.5-foot limit. Of the SRG test sections, the test section with No. 7 bars had slightly fewer cracks below the 3.5-foot limit—fewer than the test section with No. 6 bars and an equal amount of steel. For the LS section, both bar diameters behaved similarly, with only one crack found below the 3.5-foot limit.

On IH-45, the SRG section C had the fewest cracks under the 3.5-foot limit, though at the same time it had the greatest number of cracks at 3-foot spacings (15 cracks). For LS, test section H had the lowest concentration of cracks under the 3.5-foot limit. The test section with No. 7 bars and SRG coarse aggregate had a slightly lower concentration of cracks below the 3.5-foot limit than did the test section with No. 6 bars and an equal amount of steel. For the LS section, the test section with No. 6 bars had fewer cracks under the 3.5-foot limit than did the test section with No. 7 bars and an equal amount of steel.

BEHAVIOR CONSIDERING UNCONTROLLED VARIABLES

Several uncontrolled variables were identified in Chapter 2 that might affect concrete pavement performance; in particular, crack spacing was affected by the location of the reinforcing steel and by the presence of manholes.

Reinforcing Steel Location

It should be noted that for the IH-45 project, the SRG sections had more cracks exactly at 3-foot spacings. (The CRCP-7 program analysis called for a much higher average crack spacing and fewer cracks at this spacing; see Appendix G.) This phenomenon was explained as follows: Because of its thickness, the test section required an extraordinarily large amount of steel (approximately the same percentage of steel required by the other projects). To accommodate the extra steel, the reinforcing bars were placed in two layers, an arrangement that differed from the single layer used in the other test sections (see Chapter 2). It was this double-layer arrangement that produced a weakened transverse concrete plane at the location of the transverse reinforcing steel bars. During the monitoring of the test sections, it was apparent that the resulting transverse cracking was associated with the location of the transverse steel, as was confirmed by measurements taken with a "Pach-o-meter" to determine the location of the reinforcing steel.

Manholes

Center-of-the-slab manholes at the SH 6S project contributed approximately three to five cracks at each manhole. However, these cracks were closely spaced, thus lowering the already low average crack spacing for these test sections. Knowing that manholes in the middle of CRCP slabs interrupt asphalt continuity and may cause adverse stress conditions, researchers were not surprised to discover that the test section showed moderate spalling (especially the SRG sections) one year after construction. Punchouts caused by load applications (fewer than specified in the design) had already begun to show at this test section.

PREDICTED VERSUS MEASURED BEHAVIOR

Test sections were evaluated using CRCP-7, a program that predicts concrete behavior by examining crack spacing, crack width, and steel stress. (Appendix B lists parameters for the test sections.) The following discussion describes a comparison of the average measured crack spacing and crack spacing distribution versus the values predicted by the CRCP-7 computer program. Appendix G contains corresponding plots.

Average Crack Spacing

Table 4.3 summarizes the predicted crack spacings made by the CRCP-7 program for each test section.

Figure 4.13 compares the measured and predicted average crack spacings for test sections at the different project locations. Two-thirds of the average predicted crack spacings were within 2 feet of the average measured crack spacing, and the CRCP-7 model predictions for the test sections were similar to the measured data for the average crack spacings and standard deviations for all the test sections, except IH-45. For IH-45, the double steel layers, coupled with a high first-day temperature differential, induced cracks over the transverse steel bars where the bars were vertically aligned. Hence, a smaller cross-sectional area of concrete was available. It should be noted that because these two test sections were placed in the morning, they have the higher setting temperatures that result from the generated heat of hydration.

The SRG test sections placed at SH 6S represent the other overpredicted group. Here, the high temperature differentials of the first days after construction and the high thermal coefficient of the coarse aggregate combined to induce the unusual behavior of these test sections. (It should be noted that these test sections were constructed during the summer.)

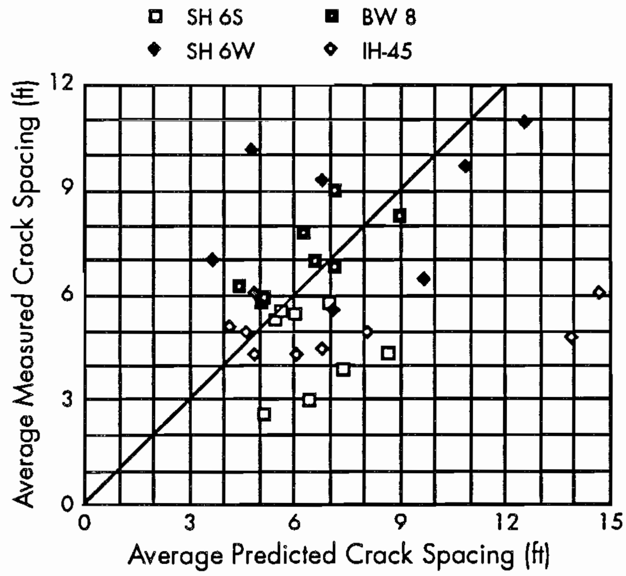

Figure 4.13 Comparison of the measured and predicted average crack spacings for BW 8

Crack Spacing Distribution

While the predicted crack spacings, when compared with the average measured crack spacings, have a good fit, the crack distribution does not. Figure 4.14 presents a typical crack distribution comparison of measured values and values predicted by the CRCP-7 program. Since the assumption of a normal distribution for the concrete strength is used to predict crack spacing, this

Table 4.3 Predicted average crack spacing

	SRG				LS			
	Section A	Section B	Section C	Section D	Section E	Section F	Section G	Section H
SH 6S	5.10	6.41	8.62	7.35	5.43	6.94	5.95	5.56
SH 6W	4.90	7.14	6.76	9.62	10.87	4.81	12.50	3.68
BW 8	5.10	6.58	8.93	7.14	6.25	7.14	5.00	4.39
IH-45	4.90	6.10	8.06	6.76	13.89	14.71	4.63	4.17

comparative difference can be explained by the following: the crack spacing does not present a normal distribution, but rather, in most cases, a bi-modal distribution, that is, one distribution near the 3-foot spacing range and the other near the 6- to 9-foot range (in some instances as high as 12 feet).

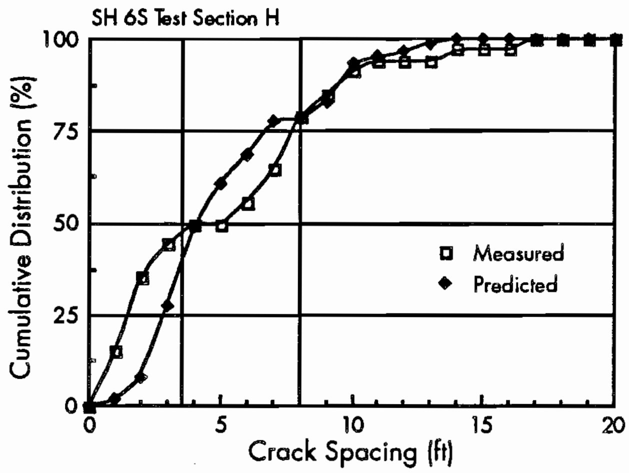

Figure 4.14 SH 6S test section H measured versus predicted crack spacing distribution

Thus, the program can be used for design purposes to predict the average crack spacing and the crack spacing distribution. The crack spacing distribution predicted by the program overestimates the pavement life based on punchout failures caused by cracks less than 3 feet long.

SUMMARY

The project constructed in the summer experienced crack spacing distributions with the greatest number of cracks under the 3.5-foot lower limit recommended by AASHTO to minimize the probability of punchouts. The IH-45 project had a greater number of cracks at the 3-foot range than expected, a result of the use of reinforcing steel in two layers, which created a weak concrete plane that induced cracks over the transverse steel.

The sections with a lower steel percentage had the greater average crack spacing for most of the projects. No definite trend could be seen with respect to crack spacing and reinforcing bar diameters. The manholes in the SH 6S project caused some unusual distress in this section, which resulted in some punchouts one year after construction. The SRG sections, though having a lower percentage of steel, showed closer average crack spacings than did the LS sections.

The CRCP-7 program, while providing a good fit for average crack spacings, produces a poor fit for crack spacing distribution. Only on the IH-45 test sections did the program predictions differ substantially from the average crack spacing measured in the field. This difference was attributed to cracks induced by the double layer of transverse reinforcing steel.

CHAPTER 5. CRACK WIDTH

INTRODUCTION

Following a discussion of the results of the crack width measurements collected from the test sections, this chapter describes the comparison of the predicted versus measured crack width behavior of the test sections.

SUMMARY OF EARLY-AGE OBSERVATIONS

This section summarizes early-age observations and describes the wide crack failure mechanism. The general conclusions made by Suh (Ref 8) regarding his early-age monitoring of test sections for crack width include the following:

(1) For the paired test sections, there was a significant difference in crack width between the siliceous river gravel (SRG) and the limestone (LS) sections. The LS sections experienced smaller crack widths than the SRG sections, even though the crack spacings were larger.

(2) In the winter projects, the crack width generally decreased as the percent steel increased.

(3) Factors that significantly affect crack width include construction season, coarse aggregate type, amount of steel, and time of crack occurrence. Hot-weather placement resulted in much wider cracks at a given slab surface temperature condition than did cool-weather placement. The use of SRG aggregates caused wider cracks than did the use of LS aggregates, and the difference was larger at lower temperatures. The greater the amount of longitudinal steel, the narrower the crack width. Cracks occurring during the first 3 days of construction were significantly wider than those occurring later.

This follow-up report of the behavior of the CRCP test sections built in Houston analyzes pavement performance for 2 consecutive years after construction.

FAILURE MECHANISM

Owing to its distinctive qualities, CRCP is designed to have cracks. Ideally, the widths of these cracks—a critical parameter in the performance of the pavement—should be small enough to provide full load transfer and prevent the flow of water through the crack. A crack with excessive width (more than 0.040 inch according to the AASHTO Guide for the Design of Pavement Structures; see Ref 23) will cause a loss of aggregate interlock, and, consequently, a reduction in load transfer. A progressive loss of load transfer will eventually transform the center-loading condition into an interior-loading condition; that is, a condition in which higher stresses are induced in the pavement slab. Figure 5.1 shows a schematic representation of a wide crack leading to a loss of load transfer.

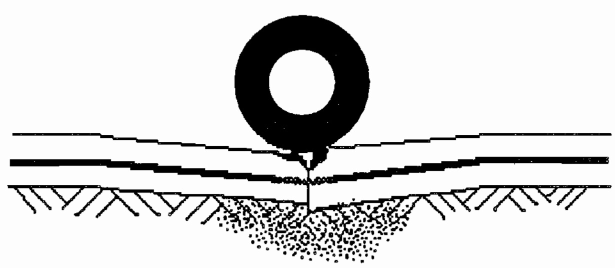

Figure 5.1 Schematic representation of a failure mechanism with loss of load transfer resulting from a wide crack

If water accumulates over a portland cement concrete pavement, it eventually penetrates the permeable concrete. Owing to the slope of the pavement cross section, water does not accumulate on the riding surface (a stratagem for ensuring that skid-resistance safety regulations are satisfied). Yet, during wet conditions, some water will always enter the pavement through cracks; if the crack width is small (less than 0.040 inch), then this water penetration will be eliminated. On the other hand, if the crack is too wide, then water will be allowed to penetrate the slab and base materials. The water in the crack may even come into direct contact with the reinforcing steel, which causes it to rust. If water saturates the base material further down, it may cause a loss of support that results in pumping. Further, the greater deflections in the pavement owing to support loss will lead to higher stresses in the slab and, in turn, increased spalling. Faulting may also occur because of load transfer loss.

ANALYSIS OF BEHAVIOR MEASUREMENTS

This section presents the results of crack width monitoring of the test sections 2 consecutive years after construction.

Behavior Parameters

Crack width was measured over each of 2 consecutive years after placement of the test sections. When possible, three measurements were made at the same locations used in early-behavior monitoring (see Ref 8) and at three other randomly selected cracks per test section. Unfortunately, owing to traffic control restrictions, crack widths could not be measured in section D on IH-45. Table 5.1 and Figure 5.2 show the average measured crack width values for the test sections. No crack width exceeded the 0.040-inch limit established by AASHTO.

It was found that crack widths vary significantly within the same test section. The standard deviation of crack widths measured for the same crack at the same temperature is 0.003 inch, and the mean for crack widths is 0.010 inch. Thus, the coefficient of variation for crack widths in the same crack is 30 percent. This finding indicates that average crack widths for a given test section should be interpreted with caution, and that a reliability concept should be applied to the results.

Figures 5.3, 5.4, and 5.5 show cracks of different widths measured in the field. Although not actually of a 1:1 scale, they are here presented at such a scale to allow the reader to see the relative differences between them.

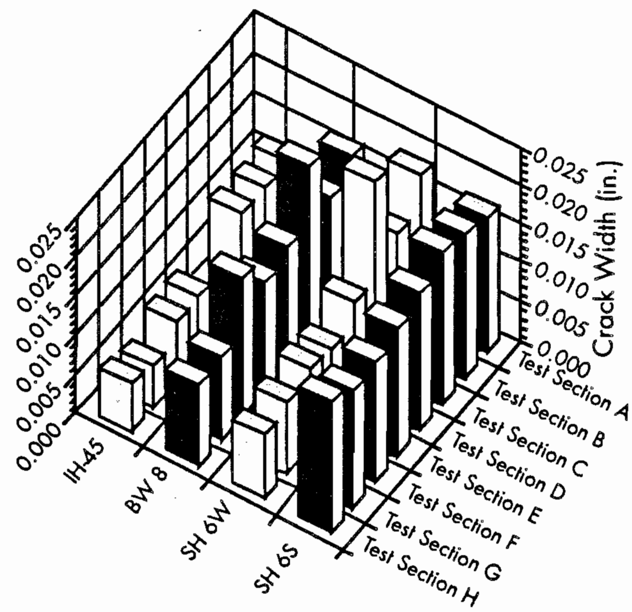

Figure 5.2 Average measured crack widths

Table 5.1 Average measured crack widths

	SRG				LS			
	Sect A	**Sect B**	**Sect C**	**Sect D**	**Sect E**	**Sect F**	**Sect G**	**Sect H**
SH 6 S	0.017	0.018	0.019	0.017	0.016	0.015	0.015	0.017
SH 6W	0.018	0.014	0.024	0.012	0.009	0.010	0.009	0.008
BW 8	0.016	0.014	0.021	0.014	0.013	0.017	0.010	0.010
IH-45	0.011	0.011	0.011	•	0.007	0.007	0.005	0.006

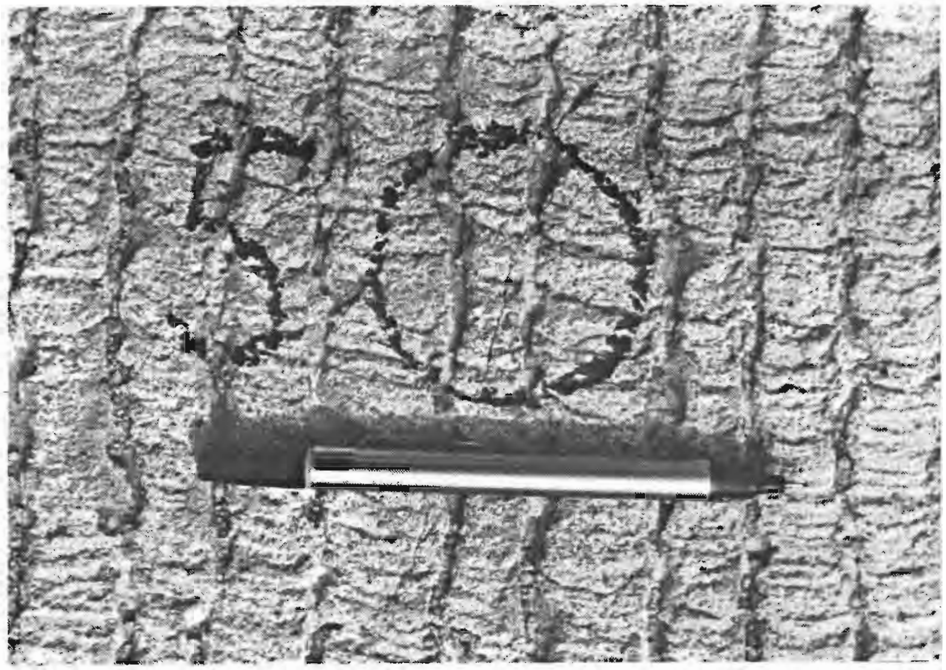

Figure 5.3 A typical crack 0.005 inch wide on BW 8, test section E

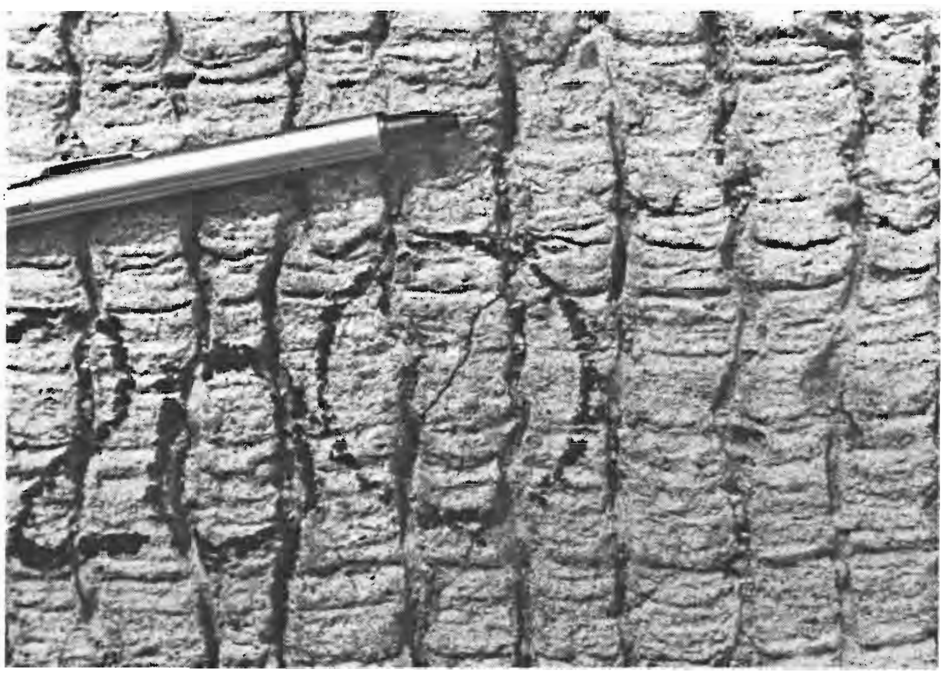

Figure 5.4 A typical crack 0.020 inch wide on BW 8, test section B

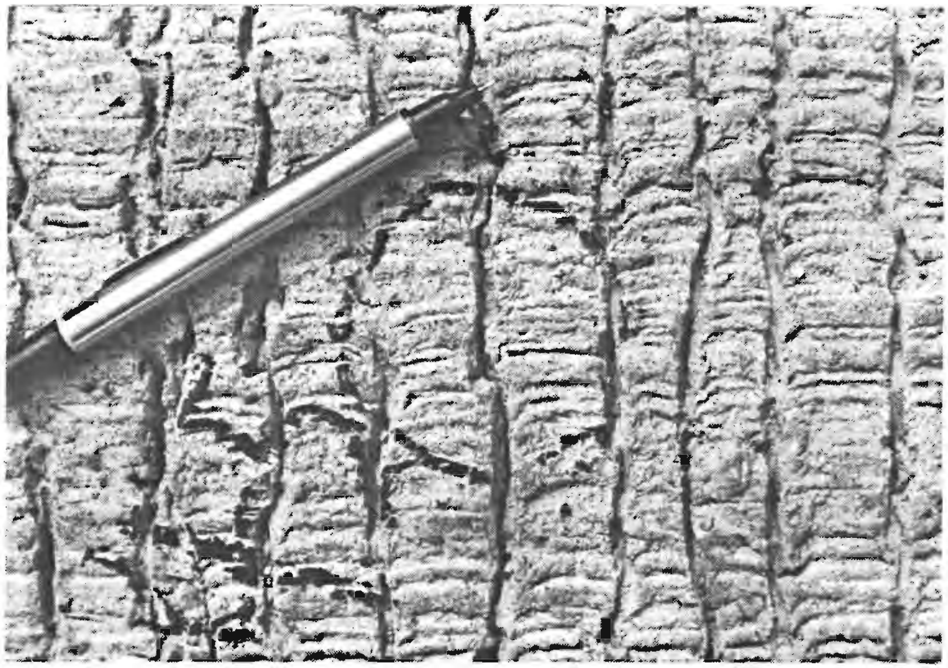

Figure 5.5 A typical crack 0.045 inch wide on BW 8, test section C

BEHAVIOR CONSIDERING CONTROLLED VARIABLES

This section discusses findings from the crack width monitoring that took place 2 consecutive years after construction of the test sections. The controlled variables were coarse aggregate type, steel percentage, bond area (reinforcing steel diameter), season of placement, and slab thickness.

Coarse Aggregate Type

In general, the SRG test sections had a higher average crack width than did the LS test sections. The explanation for this difference may be that the SRG coarse aggregate had a significantly higher (about 60 percent) thermal coefficient than did the LS aggregate (Ref 10). This finding may also be true for crack spacing.

In sections with an equivalent amount of steel, the SRG test sections had a higher average crack width than did the LS test sections. For SH 6S medium steel, the SRG test section had an average crack width of 0.018 inch, while that of the LS test section was 0.015 inch. When the test sections with medium steel in SH 6W were examined, it was found that the SRG test sections had an average crack width of 0.014 inch, while that of the LS test section was 0.009 inch. In the test sections at BW 8 with medium steel, the SRG test section had an average crack width of 0.014 inch, while the LS test section had one of 0.010 inch. Finally, for IH-45 medium steel, the SRG had an average crack width of 0.011 inch, while that for the LS test section was 0.007 inch. Figure 5.6 shows the average measured crack widths for the medium-steel sections by project locations and coarse aggregate type.

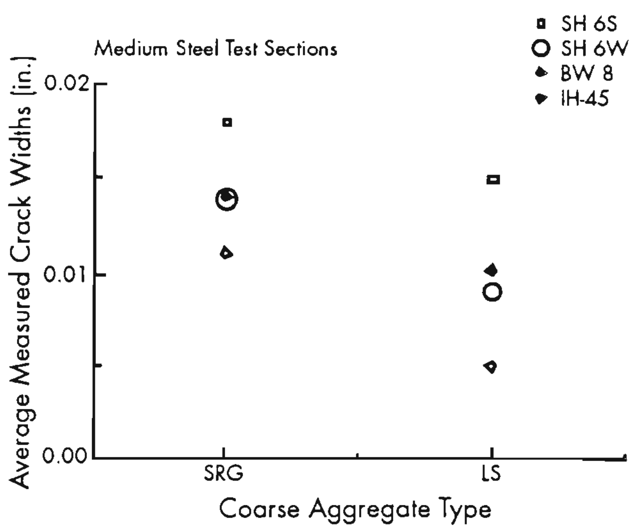

Figure 5.6 Average measured crack widths for test sections with medium steel percentage by project location and coarse aggregate type

Steel Percentage

A slight correlation can be seen between crack width measurements and steel percentages in the test sections. Theoretically, a smaller crack width should develop for a higher steel percentage, but no clear consistency for this was shown by the measurements.

For SRG in SH 6S, the test section with high steel had an average crack width of 0.017 inch, the medium-steel section 0.018 inch, and the low-steel section 0.019 inch. For LS, this trend was reversed, since the test section with high steel had an average crack width of 0.017 inch, and the medium and low steel test sections both had an average crack width of 0.015 inch.

For SH 6W, SRG shows a trend similar to that found in SH 6S: the high steel test section had an average crack width of 0.018 inch, while the low steel test section had a higher average crack width of 0.024 inch (this test section had the highest average crack spacing). The medium steel section, expected to have an average crack width between these values (approximately 0.019 inch), had instead an average crack width of only 0.014 inch. For LS, the theoretical trend of a higher percentage of steel being related to a smaller crack width continued, although the difference among the LS test sections was much smaller than that found in the SRG section. The LS high steel test section had an average crack width of 0.008 inch, the medium steel test section had an average crack width of 0.009 inch, and the low steel test section had an average crack width of 0.010 inch.

At BW 8, the trend of SRG was similar to that related to SH 6W. For instance, the high steel test section had an average crack width of 0.016 inch, the medium steel test section had a lower average crack width of 0.014 inch, and the low steel test section had a much higher average crack width of 0.021 inch. For LS, both the high steel and medium steel test sections had an average crack width of 0.010 inch, while the low steel test section had an average crack width of 0.017 inch.

At IH-45, the measured average crack widths were significantly lower than those found at the other test sections. There may be several reasons for this difference: first, the slab in this project was thicker than the slabs used in the other projects. Second, the steel was placed in two layers to facilitate construction. Many cracks were induced by the steel, but the crack width that would have normally developed in one crack was distributed into two or more induced cracks. This distribution is particularly true for the SRG test sections, where the cracks were evenly spaced at 3 ft. There the average crack width for all test sections with different steel percentages was the same (0.011 inch). This effect was also significant for the LS test sections, although it had a different impact on the crack widths. For the high steel test section, the average crack width is 0.006 inch; for the medium-steel test section, it was 0.005 inch (this value is lower than that of the high-steel test section, as would be expected); and finally, for the low-steel test section, a larger average crack width of 0.007 inch was found.

Bond Area (Reinforcing Steel Diameter)

For the same steel percentage, a larger reinforcing steel diameter will result in a smaller area of contact between the concrete and the steel. Accordingly, it may be assumed that a larger steel reinforcing bar diameter would yield a wider crack. Support for this theory was found in the LS test sections, but not in the SRG test sections, which in fact revealed a contrary trend. A possible explanation for this incongruity is that a bigger reinforcing steel diameter develops a better bond and a better interlock between the aggregate and the steel. Figures 5.7 and 5.8 show the average measured crack widths by reinforcing steel bar diameter at each project location for SRG and LS coarse aggregates, respectively.

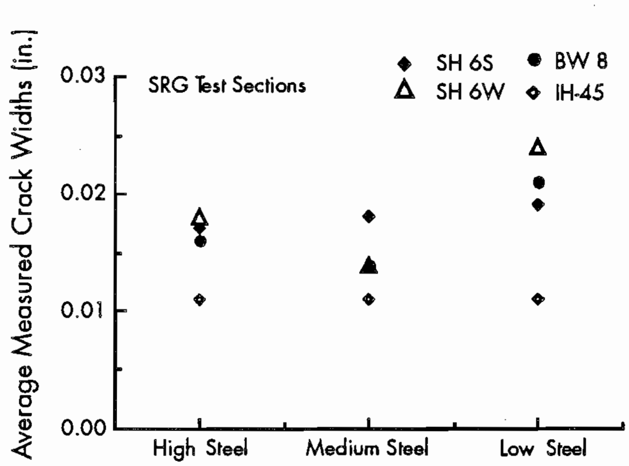

Figure 5.7 Average measured crack widths for test sections using SRG coarse aggregate by steel percentages and project location

In the SRG sections, the following trend may be noted. Contrary to what was expected for SH 6S and SH 6W, the sections using No. 7 bars for reinforcing steel had a lower average crack width than did the sections using No. 6 bars (0.018 inch versus 0.017 inch, and 0.014 inch versus 0.012 inch, respectively). Both test sections of BW 8 have the same average crack width of 0.014 inch. For IH-45, no measurement could be made for the section with No. 7 bars.

For the LS sections, a more predictable behavior was observed; that is, the test sections with No. 7

bars had a higher average crack width than those with No. 6 bars. At SH 6S, the section with No. 7 bars had an average crack width of 0.016 inch, and the section with No. 6 bars had an average crack width of 0.015 inch. At SH 6W, there was no difference in the average crack widths (0.009 inch at both sections). At BW 8, the previous trend was again observed. The section with No. 7 bars had an average crack width of 0.013 inch, while the section with No. 6 bars had an average crack width of 0.010 inch. For IH-45, the same trend was seen: the section with No. 6 bars had an average crack width of 0.005 inch and the section with No. 7 bars had one of 0.007 inch.

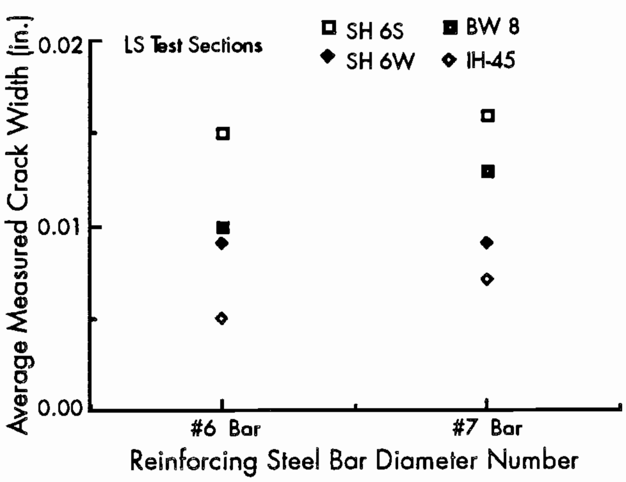

Figure 5.8 Average measured crack widths by bond area (reinforcing steel bar diameters) and project locations for test sections with LS coarse aggregate

Season of Placement

In most cases, the project built during summer (SH 6S) had a larger crack width than did the equivalent test section placed in the winter. Thus, it was determined that the major influence on crack width was the differential between setting temperature and temperature at the time of measurement. Figure 5.9 shows the average crack widths for test section G (LS medium steel). Similar plots of the other test sections may be found in Appendix I.

For test section A, the project constructed in the winter had a slightly higher average crack width than did the project constructed during the summer (about 0.001 inch). For test section B, SH 6S had an average crack width 0.004 inch higher than that for SH 6W. For test section C, SH 6W showed, surprisingly, the highest average crack width of all the test sections, that width being 0.005 inch higher than the equivalent test section placed in the summer. With individual measurements for this section representing the highest crack widths (see Appendix H), it was suggested that the resulting variability in crack width measurements was perhaps caused by a reading error. For test section D, the summer placement had a higher (about 0.005 inch) crack width than did the winter measurements.

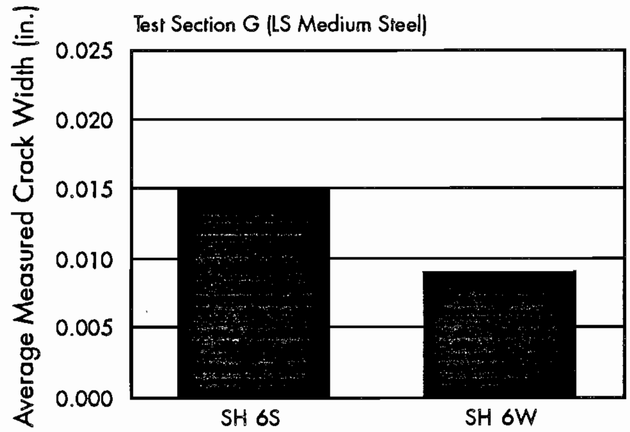

Figure 5.9 Average crack width in section G

For the LS test sections, the summer construction showed higher average crack widths than did the winter construction. With test section E, the summer construction had an average crack width that was 0.007 inch wider than the winter construction (almost double); for section F, it was 0.005 inch wider; for section G, it was 0.006 inch wider; and, finally, section H, with a 0.009-inch difference between construction seasons, evidenced the largest variation.

Slab Thickness

In general, a correlation exists between slab thickness and crack width; namely, the thicker the slab, the smaller the crack. Figure 5.10 presents the average measured crack widths by slab thickness (project location) and steel percentage for the LS test sections.

In all cases, the project that is 15 inches thick (IH-45) had the smallest crack widths. It should be remembered that this project had also the closest crack spacings for the winter-constructed test sections, and that this may affect the crack widths. For all the LS test sections, the project that is 10 inches thick (the thinnest) had the largest crack widths. This may be explained by the shrinkage-surface-to-exposed-area ratio, since, as it can be seen in Chapter 6, shrinkage has a significant impact on crack widths. For some SRG test sections (A and C, high-steel percentage and low-steel percentage, respectively), the 11-inch slab showed a larger average crack width than did the equivalent 10-inch slab; however, this difference is not statistically significant.

SUMMARY

The test sections placed in the summer had greater crack widths than did those placed in the winter, which suggests that temperature (namely, the differential between setting temperature and seasonal temperature) plays a significant role in determining crack width. Theoretically, a higher steel percentage contributes to a smaller crack, while a larger reinforcing steel-bar diameter yields a wider crack. While this pattern was not consistent throughout all the test sections, a slight correlation could be seen. Finally, the SRG test sections had a higher average crack width than did the equivalent LS test sections. This variation may also be attributed to the fact that SRG coarse aggregate has a significantly higher thermal coefficient than the LS coarse aggregate.

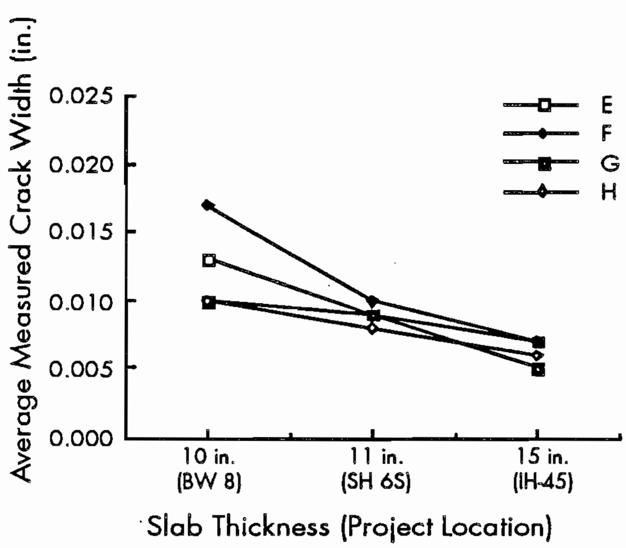

Figure 5.10 Average measured crack width for the test sections using LS coarse aggregate by slab thickness (project location)

CHAPTER 6. CRACK WIDTH MODEL

INTRODUCTION

This chapter presents, first, a comparison of measured and predicted crack width values; second, it introduces a new crack width model for the CRCP-7 computer program.

BACKGROUND

The CRCP-7 program is a mechanistic model that predicts the crack spacing, crack width, and steel stress of continuously reinforced concrete pavements (Ref 24). In the present study, these predicted values of the CRCP-7 program were compared to those values measured in the monitoring phase of this project.

What we found was that the predicted values fit poorly with the early-age monitoring of the test sections (Ref 8). In fact, the values were over-predicted by more than 100 percent. On the other hand, the program underpredicted crack width values associated with the end of the analysis period, as seen in Appendix J and in Figure 6.1. This phenomenon is the result of the strong correlation, in the current model, between predicted average crack spacings and predicted crack widths.

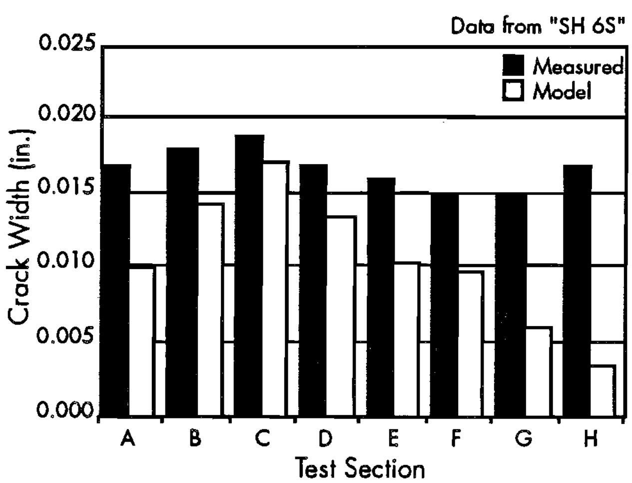

Figure 6.1 Average measured crack width versus predicted crack width for SH 6S

Because it had not yet experienced the lowest expected temperatures, the pavement had long crack spacings at early ages; accordingly, the pavement had not yet experienced the highest expected stresses. One year after placement, when the pavement had experienced a full cycle of seasonal temperatures and had experienced the lowest annual temperature, higher tensile stresses within the pavement had caused more transverse cracks to appear. Thus, the pavement had a lower average crack spacing. Since the predicted crack width model is derived from a significantly smaller average crack spacing, the predicted crack width is smaller. Consequently, the measured crack width is underpredicted.

MODEL DEVELOPMENT

This underprediction of crack width led to the development of a new crack width model based on data collected from the test sections and from an investigation of the variables and interactions thought to have a significant impact on crack width.

Time was one such variable studied. Again, the earlier report by Suh (Ref 8) postulated that crack width may be a function of time, that is, a function of the point at which the crack appears following construction, as diagrammed in Figure 6.2.

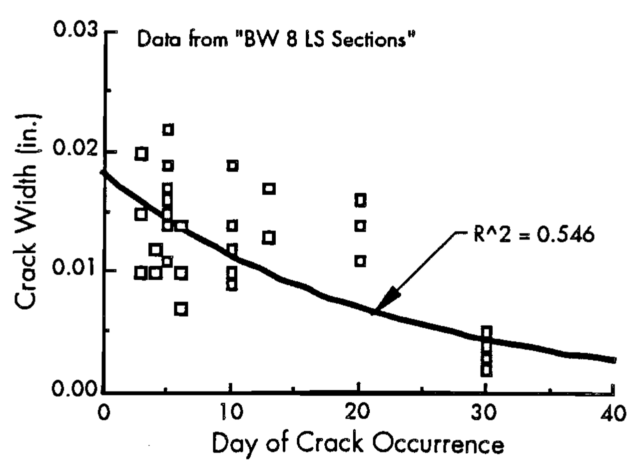

Figure 6.2 Day of crack occurrence versus crack width in the test sections using LS coarse aggregate in BW 8

Suh explained that the total expected shrinkage (the shrinkage value measured at laboratory tests) did not occur in cracks that appeared after several days of curing, and that this portion of "free" shrinkage had been absorbed by the concrete through creeping (permanent deformation caused by a re-accommodation of the concrete components during the early age of concrete). Therefore, only the residual shrinkage should be taken into account (the difference between the total expected shrinkage and the shrinkage expected to appear after construction when the crack occurs; see Refs 25-28). Figure 6.3 presents a theoretical representation of the residual shrinkage concept.

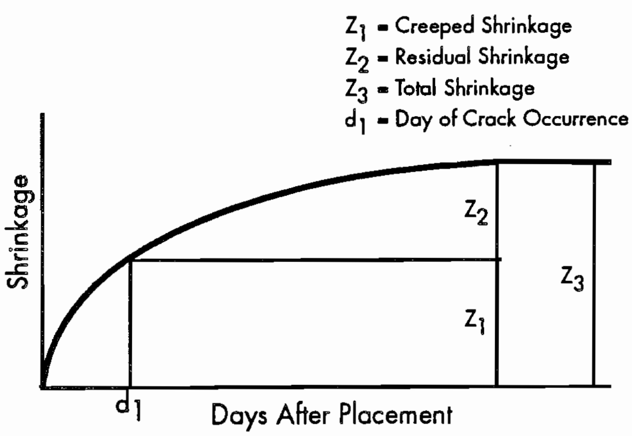

Figure 6.3 Conceptual representation of the residual shrinkage mechanism

Other variables that affect concrete creep include elastic modulus and concrete strength. Both variables are also related to concrete age: the later a crack occurs, the longer the concrete curing time, and the longer the curing time, the greater the density, strength, and elastic modulus. Through this strengthening process, the concrete will be made more impervious to the effects of either water loss or shrinkage. In addition, the pavement will be made more resistant to deformation resulting from temperature stresses; it may also have developed a tighter bond with the reinforcing steel that holds the concrete together.

The variable represented by steel bar diameter was also investigated in developing the new crack width model. As previously mentioned, the strong bond between steel and concrete helps to check crack width problems. Accordingly, it may be assumed that the higher the steel percentage in the pavement, the tighter the cracks in the pavement (though a larger bar diameter for the same steel percentage minimizes contact between the reinforcing steel and the concrete, allowing a wider crack).

Temperature changes also affect crack spacings and, hence, crack widths. The larger the temperature differential, the higher the thermal stresses. If this differential (setting temperature minus temperature at time of measurement) is positive, then the crack will have grown; but if the temperature differential is negative, then the crack will have closed (that is, the concrete will have expanded) and may even be in compression. The movement of the concrete is also a function of its thermal coefficient and of its length, as given by the basic formula:

$$CW = L_e \alpha \Delta T \qquad (6.1)$$

where:

CW = crack width, inch;
L_e = effective slab length (average of the length of the two slabs adjacent to the crack), inch;
α = thermal coefficient of the concrete, inch/inch/°F; and
ΔT = temperature differential, °F.

Experience has shown that, because no subbase friction is taken into account, Equation 6.1 overpredicts. (Subbase friction will reduce the movement of the slab.)

NEW MODEL

A regression analysis was performed using the Statistical Analysis System (SAS) program to determine which of the previously mentioned variables and interactions have a significant impact on crack width. The early-age crack width measurements, as well as the data collected in this project, were analyzed, and the following variables and interactions were specifically investigated in developing the new crack width model for the CRCP-7 program:

(1) concrete thermal coefficient,
(2) reinforcing steel percentage,
(3) reinforcing bar diameter,
(4) temperature differential,
(5) concrete shrinkage,
(6) tensile strength,
(7) elastic modulus,
(8) slab thickness,
(9) soil friction, and
(10) slab length.

The first step in the SAS analysis was to run the RSQUARE procedure, which determines R^2 correlation values for all possible combinations of the given variables. This procedure did not differentiate soil friction, since, in all cases, the test sections had the same value (that is, no variability could be found for use in the model). Nevertheless, soil friction is understood to have a significant impact on the width of cracks in CRCP. It is therefore recommended that the effect of soil friction be studied in future research. (All the test sections had a 6-inch-thick cement-stabilized base with a 1-inch-thick asphalt bond breaker.)

The next step in the SAS procedure was to run STEPWISE, an operation that generates linear regression equations (including the most significant variable for each replication) until an exclusion criterion of 0.15 significance level is reached. As the procedure includes more variables, a new model is generated. The most significant model proposed for use is the following:

$$CW = 0.028 + 740 \times Z_3 - 260.4e^{-11} \times E_i + 29 \times \alpha \times \Delta T - 203e^{-4} \times (\%) \times (\varnothing) \quad (6.2)$$

where:

CW = crack width, inch;
Z_3 = residual shrinkage, as previously defined, inch/inch;
E_i = elastic modulus on the day the crack occurred, psi;
α = thermal coefficient of the concrete, inch/inch/°F;
ΔT = temperature differential as previously defined, °F;
$\%$ = reinforcing steel percentage (0.00); and
$\varnothing$ = reinforcing bar diameter, inch.

The order of significance of these variables (from most to least) is as follows: (1) residual shrinkage; (2) temperature (interaction between thermal coefficient and temperature differential); (3) steel (interaction between steel reinforcement percentage and reinforcing bar diameter); and (4) elastic modulus (on the day the crack occurred).

Figure 6.4 shows predicted versus measured crack width values for each crack, with the different points representing all four projects. As diagrammed, the proposed model provides a good fit with the measured values. The first two lines along the equity line define one standard deviation, while the two outside lines define two standard deviations. For a normal distribution, 68 percent of the observations should fall within one standard deviation, and 95 percent of the observations should fall within two standard deviations. Because this model falls within these limits, it is statistically reliable for the measured values.

Figure 6.5 shows a comparison of measured average crack widths and crack widths predicted by the old and new models for each test section. As seen from the figure, the proposed model gives a better fit to the measured data.

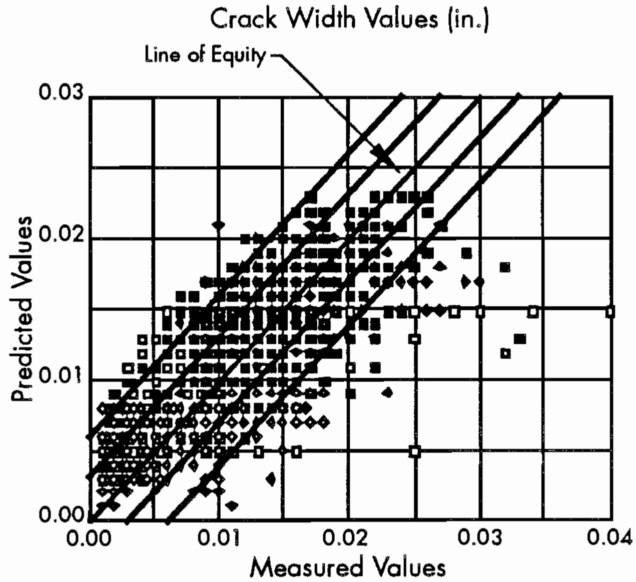

Figure 6.4 Comparison of predicted versus measured crack width values by project

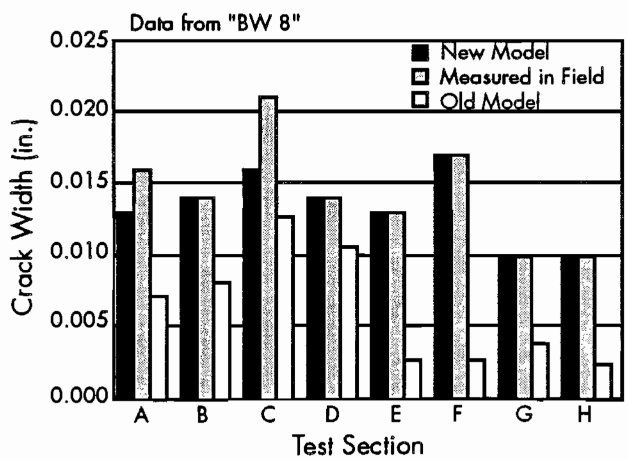

Figure 6.5 Crack width comparison between new model, measured data, and old model

SUMMARY

The existing model for calculating crack width was found to be highly dependent on crack spacing; moreover, crack widths and crack spacings within the model were poorly correlated. Crack width is a function of several variables: the day the crack occurred, the reinforcing steel, temperature, and coarse aggregate, among others. The variables that have the greatest impact on crack width are residual shrinkage, temperature (the interaction between temperature differential and thermal coefficient), steel (the interaction between bar diameter and percentage of reinforcing steel), and elastic modulus. The new model proposed for predicting crack width gives a better fit to the existing data set collected in this project than did the previous model in the CRCP-7 program.

CHAPTER 7. DISCUSSION OF RESULTS

INTRODUCTION

This chapter summarizes the objectives previously outlined in Chapter 1, namely: (1) documentation of field performance for the test sections constructed in Houston, Texas; (2) evaluation of the CRCP-89(B) design detail for CRC pavements; and (3) comparison of predicted versus measured behavior of the test sections for up to 2 years after construction.

CRCP FIELD PERFORMANCE DOCUMENTATION 2 CONSECUTIVE YEARS AFTER CONSTRUCTION

The performance of CRCP is a function of crack spacing, crack width, and steel stress. While the test sections were monitored for crack spacing and crack widths for the 2 years following placement, no provisions were made to measure steel stress. The crack spacings and crack widths, along with their measured values, are discussed in Chapters 4 and 5 and can be found in Appendices D and H, respectively.

EVALUATION OF THE CRCP-89(B) DESIGN DETAIL

The CRCP-89(B) design detail was developed on the basic assumption that pavements having equal crack spacings will exhibit equivalent performances throughout their service lives. Moreover, the CRCP-89(B) design detail was intended to predict similar crack spacings and crack widths for equivalent pavements using different coarse aggregates. The final comparisons of the test sections constructed in this project are reported below.

Crack Spacing

The project constructed during summer showed the worst crack spacing distribution, with the highest concentration of cracks under the 3.5-foot limit. The project constructed on IH-45 had a much higher concentration of cracks at the 3-foot range than expected, the explanation being that the reinforcing steel, placed in two layers, created a weak plane in the concrete, thus causing cracks to appear. The sections having a lower steel percentage had the largest average crack spacing for most of the test sections. No clear trend could be seen between crack spacing and reinforcing bar diameters. The manholes in the SH 6S project caused some unusual distress in these test sections, with some already showing punchouts. The test sections using SRG coarse aggregate, though having a lower percentage of steel, showed closer average crack spacings than those test sections using LS coarse aggregate.

Crack Width

Because a project constructed during summer has wider cracks than an equivalent project constructed during winter, it can be concluded that set temperature has a significant impact on crack widths. In general, test sections with a higher steel percentage develop smaller cracks than do test sections having a lower reinforcing steel percentage. In addition, test sections with a larger reinforcing steel bar diameter have, generally, wider cracks. In addition, because concrete with SRG has a significantly higher thermal coefficient than concrete with LS, test sections constructed with SRG coarse aggregate have wider cracks than do equivalent test sections constructed with LS coarse aggregate.

BEHAVIOR PREDICTION

The CRCP-7 program, a mechanistic model developed at the Center for Transportation Research of The University of Texas at Austin, predicts CRCP performance and behavior as a function of crack spacing, crack width, steel stress, and number of punchouts per lane per ESAL (18-kip equivalent single axle loads). This program was evaluated using crack spacing and crack width field data collected during this research project. No other parameters were evaluated.

Crack Spacing

The CRCP-7 program gives a very good fit for average crack spacings. However, it gives a poor fit for crack spacing distribution, since it assumes a normal distribution while, in reality, the test sections show a bimodal crack spacing distribution. Only in the case of the IH-45 project (especially in the E and F test sections) did the program differ substantially from the average crack spacing measured in the field. (This exception resulted from the cracks induced by the double layer of reinforcing steel.)

Crack Width

The existing model for calculating crack widths in the CRCP-7 program is highly dependent on crack spacing. Nevertheless, it was found that crack width and crack spacing do not correlate significantly. In addition, it was found that the variables having the greatest impact on crack width are day of crack occurrence, residual shrinkage (as defined in Chapter 6), temperature differential (difference between set temperature and concrete temperature at the time of measurement, as defined in Chapter 2), reinforcing steel percentage, area of bond contact between the reinforcing steel and concrete (which is a function of the reinforcing bar diameter), and elastic modulus of the concrete. Chapter 6 proposed a new model for predicting crack width.

CHAPTER 8. CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions of this study and gives some recommendations for further modifying the CRCP-7 computer program.

CONCLUSIONS

(1) The CRCP test sections constructed in Houston were monitored for 2 consecutive years after construction. In general, the performance of the winter-constructed test sections, in terms of crack spacing and crack width, was satisfactory. The test sections constructed in the summer had (poor) crack spacing consisting of a high percentage of meandering cracks (see Ref 8) and a high concentration of crack spacings below the 3.5-foot AASHTO limit (Ref 23). The SRG test sections are already experiencing minor punchouts. The crack widths measured in the test sections constructed in the summer, although greater than those measured in the equivalent winter-constructed test sections, are still well below the AASHTO limits (Ref 20).

(2) The CRCP-89(B) design detail performance was satisfactory, despite some significant differences found in the performance of the test sections. The differences between SRG and LS coarse aggregates are much smaller than those found in pavements built with the previous design details, which did not take into account the coarse aggregate type (Refs 1-3).

(3) The CRCP-7 computer program's ability to predict average crack spacing, crack spacing distribution, and crack width was evaluated. In general, the computer program gives a very good prediction of average crack spacing (given the different variables considered) and an acceptable prediction for the crack spacing distribution. Because the predicted crack width values are dependent on the crack spacing, a new model is proposed that accounts for the age at which a crack occurs.

RECOMMENDATIONS

(1) Long-term monitoring of the test sections should be undertaken to evaluate their performance.

(2) The proposed method for calculating set temperature should be studied in more detail. Several tables should be developed to calculate temperature increase using placement temperature for each different coarse aggregate type.

(3) Installation of manholes on CRCP should be avoided; if necessary, these manholes should be located on the shoulder or median (to avoid the pavement distress associated with them).

(4) Future research should investigate the effect of subbase friction on crack widths, so that different subbase materials may be included in the mix design.

(5) A weak plane in the concrete created by multiple stacking of transverse steel should be avoided. When more than one layer of steel is needed, it should be placed in an alternating pattern. A diagonal placement should also be considered.

(6) The use of low thermal coefficient coarse aggregates is recommended. If a coarse aggregate with a high thermal coefficient is used, or when hot-weather construction is proposed, provisions should be made to minimize the concrete set temperature to maintain the lowest possible thermally induced stresses.

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APPENDIX A. THE CRCP-89(B) DESIGN DETAIL

T (IN.)	LONG. BAR SIZE	SPACING C (IN.) COARSE AGGREGATE TYPE ①		TRANSVERSE STEEL REQUIREMENTS ③ FOR GIVEN PAVEMENT WIDTHS (FT)						
		A	B	≤ 40	41-50	51-60	61-70	71-80	81-90	91-100
8	5	9.5	8	#4 @ 36"	#4 @ 29"	#5 @ 37"	#5 @ 32"	#5 @ 26"	#6 @ 35"	#6 @ 32"
9	5	8	6.5	#4 @ 32"	#4 @ 26"	#5 @ 33"	#5 @ 28"	#6 @ 35"	#6 @ 31"	#6 @ 28"
10	6	9	7.5	#4 @ 29"	#5 @ 36"	#5 @ 30"	#6 @ 36"	#6 @ 32"	#6 @ 28"	#6 @ 25"
11	6	7.5	6.5	#4 @ 26"	#5 @ 32"	#5 @ 27"	#6 @ 33"	#6 @ 29"	#6 @ 26"	#6 @ 23"
12	6	6.5	6	#5 @ 37"	#5 @ 30"	#6 @ 35"	#6 @ 30"	#6 @ 26"	#6 @ 23"	#6 @ 21"
13	6 ②	12	10	#4 @ 36"	#4 @ 35"	#4 @ 30"	#4 @ 25"	#5 @ 34"	#5 @ 31"	#5 @ 27"
14	6 ②	10	9	#4 @ 36"	#4 @ 33"	#4 @ 27"	#5 @ 36"	#5 @ 32"	#5 @ 28"	#6 @ 36"
15	6 ②	9	8	#4 @ 38"	#4 @ 31"	#4 @ 26"	#5 @ 36"	#5 @ 30"	#6 @ 38"	#6 @ 34"

① COARSE AGGREGATE TYPE B IS LIMESTONE AGGREGATE. COARSE AGGREGATE TYPE A IS ALL OTHER TYPES OF AGGREGATE. IF ANY UNCERTAINTY EXISTS AS TO WHETHER AN AGGREGATE IS TO BE CONSIDERED LIMESTONE, A SAMPLE SHALL BE SUBMITTED TO THE MATERIALS AND TEST DIVISION. THOSE MATERIALS EXHIBITING LESS THAN 50% ACID INSOLUBLE RESIDUE WHEN A CRUSHED PORTION IS TESTED IN ACCORDANCE WITH TEST METHOD TEX 612 J SHALL BE CONSIDERED COARSE AGGREGATE TYPE B.

② FOR PAVEMENTS 13" OR GREATER IN THICKNESS, TWO LAYERS OF LONGITUDINAL AND TRANSVERSE STEEL SHALL BE USED. WHEN THE "DOUBLE STRIKE-OFF" PROCEDURE IS NOT USED CHAIRS WILL BE REQUIRED TO SUPPORT BOTH LAYERS OF STEEL, AS SHOWN IN THE TABLE ABOVE.

③ TRANSVERSE STEEL MUST BE INCREASED AS PAVEMENTS WIDEN. PAVEMENT WIDTH SHALL BE MEASURED AT RIGHT ANGLES TO THE CENTERLINE AND SHALL INCLUDE ALL MAINLANES, CONNECTORS, RAMPS AND CONCRETE SHOULDERS THAT ARE TIED TOGETHER.

④ LONGITUDINAL AND TRANSVERSE BARS SHALL BE DEFORMED STEEL CONFORMING TO ASTM A-615 OR ASTM A-616 (GRADE 60) AS NOTED IN THE STANDARD SPECIFICATION.

⑤ ADDITIONAL STEEL AT THE TRANSVERSE CONSTRUCTION JOINTS SHALL BE BARS OF EQUAL DIAMETER, AND A SPACING OF DOUBLE THAT SPECIFIED FOR THE LONGITUDINAL STEEL OF THE GIVEN THICKNESS. THE LENGTH OF THE BARS SHALL BE 66 TIMES THE BAR DIAMETER ("D").

⑥ TRANSVERSE TIEBARS AT THE LONGITUDINAL CONSTRUCTION JOINTS SHALL BE BARS OF EQUAL DIAMETER AND SPACING TO THOSE SPECIFIED FOR THE TRANSVERSE STEEL OF THE GIVEN THICKNESS. THE LENGTH OF THE BARS SHALL BE 66 TIMES THE BAR DIAMETER ("D").

⑦ UNLESS SHOWN ELSEWHERE ON THE PLANS, THE LONGITUDINAL JOINTS SHALL BE LOCATED WITHIN 6" OF THE LANE LINES.

⑧ IF SILICEOUS RIVER GRAVEL IS USED AS A COARSE AGGREGATE, THE SAWCUT DEPTH SHALL BE T/3.

⑨ WHEN MACHINE-PLACING OF STEEL REINFORCEMENT IS USED, THE USE OF CHAIRS SHALL NOT BE REQUIRED, AND THE TRANSVERSE STEEL MAY BE PLACED ABOVE OR BELOW THE LONGITUDINAL STEEL.

⑩ THE NUMBER OF BARS REQUIRED FOR THE VARIOUS PLACEMENT WIDTHS (INDICATED IN THE TABLE) INCLUDES BARS AT "B" SPACING ON BOTH SIDES WITH AN OVERHANG "A".
"A" SPACING SHALL BE BETWEEN 3" AND 4".
"B" SPACING SHALL BE BETWEEN 3" AND 6".
THE TWO SPACINGS COMBINED ("A" AND "B"), LOCATED AT BOTH LONGITUDINAL EDGES OF THE POUR, SHALL PROVIDE FOR THE REMAINING SPACE AND STEEL LOCATION TO ROUND OUT THE PLACEMENT WIDTH.

1. NO EXPANSION JOINTS WILL BE USED EXCEPT AT STRUCTURE ENDS OR FIXED OBJECTS AS SHOWN ELSEWHERE IN THE PLANS.
2. PAVEMENT WIDTHS IN EXCESS OF 16' SHALL BE PROVIDED WITH A LONGITUDINAL JOINT AT THE LOCATION INDICATED BY THE ENGINEER.
3. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND REINFORCEMENT REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT."
4. DETAILS AS TO PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
5. WITHIN ANY AREA BOUNDED BY TWO FEET OF PAVEMENT LENGTH MEASURED PARALLEL TO THE CENTERLINE AND TWELVE FEET OF PAVEMENT WIDTH MEASURED PERPENDICULAR TO THE PAVEMENT CENTERLINE, NOT OVER 33% OF THE REGULAR LONGITUDINAL STEEL SHALL BE SPLICED.
6. THE LONGITUDINAL STEEL SHALL BE PLACED AT THE VERTICAL SLAB CENTER WITH A TOLERANCE OF 1/2 INCH. TRANSVERSE STEEL SHALL BE PLACED DIRECTLY ABOVE OR BELOW THE LONGITUDINAL STEEL.
7. SPLICES SHALL BE A MINIMUM OF 33 TIMES THE NOMINAL STEEL DIAMETER ("D").
8. BARS THAT REQUIRE BENDING SHALL BE GRADE 40 STEEL CONFORMING TO REQUIREMENTS OF ASTM DESIGNATION A 615. SPACINGS FOR GRADE 40 STEEL SHALL BE 2/3 OF THAT SPECIFIED FOR GRADE 60 STEEL.
9. AT TRANSVERSE CONSTRUCTION JOINTS THE REGULAR LONGITUDINAL STEEL SHALL EXTEND A MINIMUM OF FOUR FEET ON EITHER SIDE OF THE JOINT.
10. VIBRATION WITH HAND-MANIPULATED MECHANICAL VIBRATORS WILL BE REQUIRED ADJACENT TO ALL TRANSVERSE CONSTRUCTION JOINTS.
11. THE CHAIRS USED TO SUPPORT THE STEEL SHALL BE OF SUFFICIENT STRUCTURAL QUALITY AND NUMBER TO HOLD THE STEEL MAT WITHIN THE PLACEMENT HEIGHT TOLERANCES. CHAIRS SHALL BE OF A TYPE APPROVED BY THE ENGINEER.
12. WITH THE APPROVAL OF THE ENGINEER, MULTIPLE PIECE TIEBARS (THREADED COUPLING OR OTHER ADEQUATE DEVICE) MAY BE USED TO FACILITATE CONSTRUCTION PROVIDED THE SYSTEM DEVELOPS A FORCE EQUAL TO 1-1/2 TIMES THE MINIMUM YIELD STRENGTH OF THE TIEBAR SHOWN. THE SPACING FOR THE SYSTEM SHALL BE LESS THAN OR EQUAL TO THAT OF THE TIEBARS SHOWN.
13. JOINT, GROOVE AND SEAL DETAILS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
14. LONGITUDINAL AND TRANSVERSE STEEL SPACING SHALL NOT VARY MORE THAN ONE-TWELFTH OF THE SPACING SHOWN HEREON.
15. IF WIDTHS OCCUR, OTHER THAN THE TYPICAL WIDTHS SHOWN, INDIVIDUAL BARS OF THE SIZE SPECIFIED HEREON MAY BE ADDED OR REMOVED TO OBTAIN THE APPROPRIATE WIDTH. SPACING REQUIREMENTS SHALL NOT BE EXCEEDED, HOWEVER.

CHAIR SIZES (IN.) ⑩ FOR TWO LAYER STEEL PLACEMENT		
T (IN.)	TOP STEEL	BOTTOM STEEL
13	6.5	3
14	7.5	4
15	8	4.5

SPACING C (IN.)	NUMBER OF BARS ● REQUIRED FOR VARIOUS TYPICAL PLACEMENT WIDTHS (FT.)						
	12	16	22	24	27	34	36
6	24	32	44	48	54	68	76
6.5	22	30	41	44	50	63	70
7.5	19	26	35	38	43	54	61
8	18	24	33	36	41	51	57
9	16	21	29	32	36	45	51
9.5	15	20	28	30	34	43	48
10	14	19	26	29	32	41	46
12	12	16	22	24	27	34	38

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

CONCRETE PAVEMENT DETAILS

CONTINUOUSLY REINFORCED CRCP-(B)-87

APPENDIX B. CRCP-7 PROGRAM INPUT DATA FOR THE TEST SECTIONS

This appendix presents the input data required to run the CRCP-7 computer program for all the test sections placed in Houston, Texas. These input data include such project specifications as percent steel and concrete thickness, set temperature and minimum daily temperatures collected from early age monitoring, and concrete physical properties (Ref 10) for each project location. All other values, such as the coefficient of variance of the material, are typical.

CRCP-7 INPUT FACTORIAL FOR SH-6S					
	SRG Test Sections				
Test Section		A	B	C	D
Steel Properties					
Percentage of steel		0.0063	0.0053	0.0042	0.0053
Bar diameter		0.75	0.75	0.75	0.875
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient		0.000005	0.000005	0.000005	0.000005
Concrete Properties					
Slab Thickness		11	11	11	11
Thermal Coefficient		0.0000055	0.0000055	0.0000055	0.0000055
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		105	103	103	101
Days to full strength		28	28	28	28
Minimum yearly temp		25.5	25.5	25.5	25.5
Days to minimum temp		180	180	180	180
Minimum daily temp					
	DAY				
	1	92.0	92.0	92.0	92.0
	2	83.0	83.0	83.0	83.0
	3	81.0	81.0	81.0	81.0
	4	82.0	82.0	82.0	82.0
	5	81.0	81.0	81.0	81.0
	6	84.0	84.0	84.0	84.0
	7	76.3	76.3	76.3	76.3
	8	73.0	73.0	73.0	73.0
	9	75.5	75.5	75.5	75.5
	10	74.8	74.8	74.8	74.8
	11	75.5	75.5	75.5	75.5
	12	75.5	75.5	75.5	75.5
	13	74.0	74.0	74.0	74.0
	14	76.3	76.3	76.3	76.3
	15	75.5	75.5	75.5	75.5
	16	76.3	76.3	76.3	76.3
	17	77.8	77.8	77.8	77.8
	18	78.5	78.5	78.5	78.5
	19	74.8	74.8	74.8	74.8
	20	78.0	78.0	78.0	78.0
	21	75.5	75.5	75.5	75.5

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	22	75.5	75.5	75.5	75.5
	23	74.8	74.8	74.8	74.8
	24	75.5	75.5	75.5	75.5
	25	80.0	80.0	80.0	80.0
	26	75.5	75.5	75.5	75.5
	27	78.5	78.5	78.5	78.5
	28	77.0	77.0	77.0	77.0
External Load					
Days to wheel load		14	14	14	14
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		600	600	600	600
28 Elastic Modulus		5400000	5400000	5400000	5400000
28 Shrinkage		0.000209	0.000209	0.000209	0.000209
28 Compresive Strength		6252	6252	6252	6252
Aggregate Type		SRG 8	SRG 8	SRG 8	SRG 8
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

CRCP-7 INPUT FACTORIAL FOR SH-6S					
	LS Test Sections				
Test Section		E	F	G	H
Steel Properties					
Percentage of steel		0.0063	0.0052	0.0061	0.0068
Bar diameter		0.875	0.75	0.75	0.75
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient		0.000005	0.000005	0.000005	0.000005
Concrete Properties					
Slab Thickness		11	11	11	11
Thermal Coefficient		0.0000031	0.0000031	0.0000031	0.0000031
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		113	107	97	92
Days to full strength		28	28	28	28
Minimum yearly temp		25.5	25.5	25.5	25.5
Days to minimum temp		180	180	180	180
Minimum daily temp					
	DAY				
	1	101	101	101	101
	2	86.0	86.0	86.0	86.0
	3	83.0	83.0	83.0	83.0
	4	76.3	76.3	76.3	76.3
	5	74.0	74.0	74.0	74.0
	6	74.8	74.8	74.8	74.8
	7	75.5	75.5	75.5	75.5
	8	77.0	77.0	77.0	77.0
	9	71.0	71.0	71.0	71.0
	10	72.0	72.0	72.0	72.0
	11	75.5	75.5	75.5	75.5
	12	76.3	76.3	76.3	76.3
	13	77.8	77.8	77.8	77.8
	14	78.5	78.5	78.5	78.5
	15	74.8	74.8	74.8	74.8
	16	76.3	76.3	76.3	76.3
	17	75.0	75.0	75.0	75.0
	18	75.5	75.5	75.5	75.5
	19	74.8	74.8	74.8	74.8
	20	75.5	75.5	75.5	75.5
	21	76.3	76.3	76.3	76.3

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	22	78.0	78.0	78.0	78.0
	23	78.5	78.5	78.5	78.5
	24	77.0	77.0	77.0	77.0
	25	76.3	76.3	76.3	76.3
	26	78.5	78.5	78.5	78.5
	27	80.1	80.1	80.1	80.1
	28	77.8	77.8	77.8	77.8
External Load					
Days to wheel load		14	14	14	14
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		497	497	497	497
28 Elastic Modulus		5530000	5530000	5530000	5530000
28 Shrinkage		0.00016	0.00016	0.00016	0.00016
28 Compresive Strength		7372	7372	7372	7372
Aggregate Type		LS 7	LS 7	LS 7	LS 7
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

CRCP-7 INPUT FACTORIAL FOR SH-6W					
	SRG Test Sections				
Test Section		A	B	C	D
Steel Properties					
Percentage of steel		0.0063	0.0053	0.0042	0.0053
Bar diameter		0.75	0.75	0.75	0.875
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient		0.000005	0.000005	0.000005	0.000005
Concrete Properties					
Slab Thickness		11	11	11	11
Thermal Coefficient		0.0000055	0.0000055	0.0000055	0.0000055
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		79.9	78.4	71.2	71.2
Days to full strength		28	28	28	28
Minimum yearly temp		37	37	37	37
Days to minimum temp		360	360	360	360
Minimum daily temp					
	DAY				
	1	64.0	64.8	63.2	63.2
	2	64.8	64.6	50.8	50.8
	3	50.4	49.6	57.0	57.0
	4	56.2	57.0	55.8	55.8
	5	55.8	55.8	65.7	65.7
	6	65.7	65.7	66.4	66.4
	7	66.4	66.4	70.2	70.2
	8	70.2	70.2	72.5	72.5
	9	72.5	72.5	49.6	49.6
	10	49.6	49.6	55.0	55.0
	11	55.0	55.0	51.3	51.3
	12	51.3	51.3	48.2	48.2
	13	48.2	48.2	56.6	56.6
	14	56.6	56.6	54.8	54.8
	15	54.8	54.8	48.2	48.2
	16	48.2	48.2	45.2	45.2
	17	45.2	45.2	63.4	63.4
	18	63.8	63.8	55.8	55.8
	19	55.8	55.8	48.2	48.2
	20	48.2	48.2	52.0	52.0
	21	52.0	52.0	52.8	52.8

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	22	52.8	52.8	63.4	63.4
	23	63.4	63.4	64.1	64.1
	24	64.1	64.1	53.5	53.5
	25	53.5	53.5	47.5	47.5
	26	47.5	47.5	45.2	45.2
	27	45.2	45.2	58.8	58.8
	28	58.8	58.8	61.1	61.1
External Load					
Days to wheel load		14	14	14	14
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		554	554	554	554
28 Elastic Modulus		5490000	5490000	5490000	5490000
28 Shrinkage					
28 Compresive Strength					
Aggregate Type		SRG 8	SRG 8	SRG 8	SRG 8
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength					
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

CRCP-7 INPUT FACTORIAL FOR SH-6W					
	LS Test Sections				
Test Section		E	F	G	H
Steel Properties					
Percentage of steel		0.0063	0.0052	0.0061	0.0068
Bar diameter		0.875	0.75	0.75	0.75
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient		0.000005	0.000005	0.000005	0.000005
Concrete Properties					
Slab Thickness		11	11	11	11
Thermal Coefficient		0.0000038	0.0000038	0.0000038	0.0000038
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		72.9	64.8	64.8	64.8
Days to full strength		28	28	28	28
Minimum yearly temp		37	37	37	37
Days to minimum temp		360	360	360	360
Minimum daily temp					
	DAY				
	1	63.2	57.8	57.8	57.8
	2	50.8	61.3	61.3	61.3
	3	57.0	55.8	55.8	55.8
	4	55.8	65.7	65.7	65.7
	5	65.7	66.4	66.4	66.4
	6	66.4	70.2	70.2	70.2
	7	70.2	72.5	72.5	72.5
	8	72.5	49.6	49.6	49.6
	9	49.6	55.0	55.0	55.0
	10	55.0	51.3	51.3	51.3
	11	51.3	48.2	48.2	48.2
	12	48.2	56.6	56.6	56.6
	13	56.6	54.8	54.8	54.8
	14	54.8	48.2	48.2	48.2
	15	48.2	45.2	45.2	45.2
	16	45.2	63.4	63.4	63.4
	17	63.4	55.8	55.8	55.8
	18	55.8	48.2	48.2	48.2
	19	48.2	52.0	52.0	52.0
	20	52.0	52.8	52.8	52.8
	21	52.8	63.4	63.4	63.4

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	22	63.4	64.1	64.1	64.1
	23	64.1	53.5	53.5	53.5
	24	53.5	47.5	47.5	47.5
	25	47.5	45.2	45.2	45.2
	26	45.2	58.8	58.8	58.8
	27	58.8	61.1	61.1	61.1
	28	61.1	66.4	66.4	66.4
External Load					
Days to wheel load		14	14	14	14
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		556	556	556	556
28 Elastic Modulus		5390000	5390000	5390000	5390000
28 Shrinkage					
28 Compresive Strength					
Aggregate Type		LS 7	LS 7	LS 7	LS 7
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

	CRCP-7 INPUT FACTORIAL FOR BW-8			
	SRG Test Sections			
Test Section	A	B	C	D
Steel Properties				
Percentage of steel	0.0062	0.005	0.0038	0.0048
Bar diameter	0.75	0.75	0.75	0.875
Yield Stress	60000	60000	60000	60000
Elastic Modulus	29000000	29000000	29000000	29000000
Thermal Coefficient	0.000005	0.000005	0.000005	0.000005
Concrete Properties				
Slab Thickness	10	10	10	10
Thermal Coefficient	0.0000084	0.0000084	0.0000084	0.0000084
Coefficient of variation	20	20	20	20
ify	1	1	1	1
Environmental Inputs				
Curing Temperature	69.5	69.9	70.3	71.9
Days to full strength	28	28	28	28
Minimum yearly temp	25	25	25	25
Days to minimum temp	30	30	30	30
Minimum daily temp				
DAY				
1	68.7	68.1	67.5	70.5
2	71.6	71.0	70.4	71.8
3	69.5	71.2	70.9	71.3
4	70.7	69.0	67.2	70.2
5	57.6	55.7	53.8	56.4
6	54.7	55.1	55.6	56.1
7	51.5	52.4	53.2	54.0
8	52.8	52.8	52.8	52.8
9	55.8	55.8	55.8	55.8
10	49.7	49.7	49.7	49.7
11	45.7	45.1	44.5	45.9
12	50.5	50.5	50.5	50.5
13	65.7	65.7	65.7	65.7
14	49.5	48.8	48.2	48.3
15	46.7	46.7	46.7	46.7
16	41.4	41.4	41.4	1.4
17	51.3	51.3	51.3	51.3
18	47.5	47.5	47.5	47.5
19	39.1	39.1	39.1	39.1
20	34.6	34.6	34.6	34.6
21	47.3	46.4	45.4	43.3

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	22	41.4	41.4	41.4	41.4
	23	34.6	34.6	34.6	34.6
	24	43.7	43.7	43.7	43.7
	25	44.4	44.4	44.4	44.4
	26	46.7	46.7	46.7	46.7
	27	43.0	42.3	41.6	42.7
	28	42.9	42.9	42.9	42.9
External Load					
Days to wheel load		30	30	30	30
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		558	558	558	558
28 Elastic Modulus		4680000	4680000	4680000	4680000
28 Shrinkage		0.000245	0.000245	0.000245	0.000245
28 Compresive Strength		5567	5567	5567	5567
Aggregate Type		SRG 8	SRG 8	SRG 8	SRG 8
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

	CRCP-7 INPUT FACTORIAL FOR BW-8				
	LS Test Sections				
Test Section		E	F	G	H
Steel Properties					
Percentage of steel		0.0056	0.0045	0.0058	0.0067
Bar diameter		0.875	0.75	0.75	0.75
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient		0.000005	0.000005	0.000005	0.000005
Concrete Properties					
Slab Thickness		10	10	10	10
Thermal Coefficient		0.0000055	0.0000055	0.0000055	0.0000055
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		75.3	76.0	81.7	76.9
Days to full strength		28	28	28	28
Minimum yearly temp		25	25	25	25
Days to minimum temp		30	30	30	30
Minimum daily temp					
	DAY				
	1	75	77.6	80.7	79.1
	2	72.8	72.5	73.3	72.2
	3	68.9	69.0	67.8	67.5
	4	54.6	54.6	52.6	53.3
	5	56.2	56.8	56.4	56.8
	6	53.8	54.3	54.0	54.3
	7	52.8	52.8	52.8	52.8
	8	55.8	55.8	55.8	55.8
	9	49.7	49.7	49.7	49.7
	10	45.1	46.0	46.5	46.7
	11	50.5	50.5	50.5	50.5
	12	65.7	65.7	65.7	65.7
	13	47.7	48.2	47.9	48.8
	14	46.7	46.7	46.7	46.7
	15	41.4	41.4	41.4	41.4
	16	51.3	51.3	51.3	51.3
	17	47.5	47.5	47.5	47.5
	18	39.1	39.1	39.1	39.1
	19	34.6	34.6	34.6	34.6
	20	43.9	45.0	45.4	45.4
	21	41.4	41.4	41.4	41.4

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	22	34.6	34.6	34.6	34.6
	23	43.7	43.7	43.7	43.7
	24	44.4	44.4	44.4	44.4
	25	46.7	46.7	46.7	46.7
	26	42.1	42.2	42.8	42.3
	27	42.9	42.9	42.9	42.9
	28	30.0	30.0	30.0	30.0
External Load					
Days to wheel load		30	30	30	30
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		478	478	478	478
28 Elastic Modulus		4140000	4140000	4140000	4140000
28 Shrinkage		0.00011	0.00011	0.00011	0.00011
28 Compresive Strength		5886	5886	5886	5886
Aggregate Type		LS 7	LS 7	LS 7	LS 7
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

CRCP-7 INPUT FACTORIAL FOR SH-6S					
	SRG Test Sections				
Test Section		A	B	C	D
Steel Properties					
Percentage of steel		0.0076	0.0065	0.0055	0.0067
Bar diameter		0.75	0.75	0.75	0.875
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient		0.000005	0.0000005	0.0000005	0.0000005
Concrete Properties					
Slab Thickness		15	15	15	15
Thermal Coefficient		0.0000066	0.0000066	0.0000066	0.0000066
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		78.1	78.1	73.7	73.7
Days to full strength		28	28	28	28
Minimum yearly temp		37	37	37	37
Days to minimum temp		350	350	350	350
Minimum daily temp					
	DAY				
	1	78.2	78.2	72.7	72.7
	2	75.2	75.2	70.7	70.7
	3	69.2	69.2	67.8	67.8
	4	68.1	68.1	68.6	68.6
	5	67.2	67.2	67.0	67.0
	6	59.4	59.4	59.9	59.9
	7	53.0	53.0	53.0	53.0
	8	52.0	52.0	52.6	52.6
	9	55.2	55.2	55.3	55.3
	10	63.2	63.2	62.9	62.9
	11	53.3	53.3	52.7	52.7
	12	45.6	45.6	45.7	45.7
	13	45.2	45.2	45.2	45.2
	14	63.4	63.4	63.4	63.4
	15	55.8	55.8	55.8	55.8
	16	48.2	48.2	48.2	48.2
	17	52.0	52.0	52.0	52.0
	18	52.8	52.8	52.8	52.8
	19	63.4	63.4	63.4	63.4
	20	64.1	64.1	64.1	64.1
	21	53.5	53.5	53.5	53.5

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	22	47.5	47.5	47.5	47.5
	23	45.2	45.2	45.2	45.2
	24	58.8	58.8	58.8	58.8
	25	61.1	61.1	61.1	61.1
	26	66.4	66.4	66.4	66.4
	27	64.1	64.1	64.1	64.1
	28	52.0	52.0	52.0	52.0
External Load					
Days to wheel load		30	30	30	30
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		465	465	465	465
28 Elastic Modulus		5500000	5500000	5500000	5500000
28 Shrinkage		0.00018	0.00018	0.00018	0.00018
28 Compresive Strength		5273	5273	5273	5273
Aggregate Type		SRG 8	SRG 8	SRG 8	SRG 8
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

CRCP-7 INPUT FACTORIAL FOR SH-6S					
	LS Test Sections				
Test Section		E	F	G	H
Steel Properties					
Percentage of steel		0.0075	0.0063	0.0074	0.0084
Bar diameter		0.875	0.75	0.75	0.75
Yield Stress		60000	60000	60000	60000
Elastic Modulus		29000000	29000000	29000000	29000000
Thermal Coefficient					
Concrete Properties					
Slab Thickness		15	15	15	15
Thermal Coefficient		0.0000041	0.0000041	0.0000041	0.0000041
Coefficient of variation		20	20	20	20
ify		1	1	1	1
Environmental Inputs					
Curing Temperature		75.2	75.2	69	69
Days to full strength		28	28	28	28
Minimum yearly temp		37	37	37	37
Days to minimum temp		350	350	35	35
Minimum daily temp					
	DAY				
	1	59.1	59.1	62.6	62.6
	2	64.8	64.8	64.3	64.3
	3	62.5	62.5	61.9	61.9
	4	55.3	55.3	55.0	55.0
	5	47.3	47.3	48.2	48.2
	6	45.2	45.2	45.2	45.2
	7	63.4	63.4	63.4	63.4
	8	55.8	55.8	55.8	55.8
	9	48.2	48.2	48.2	48.2
	10	52.0	52.0	52.0	52.0
	11	52.8	52.8	52.8	52.8
	12	63.8	63.8	63.4	63.4
	13	64.1	64.1	64.1	64.1
	14	53.5	53.5	53.5	53.5
	15	47.5	47.5	47.5	47.5
	16	45.2	45.2	45.2	45.2
	17	58.8	58.8	58.8	58.8
	18	61.1	61.1	61.1	61.1
	19	66.4	66.4	66.4	66.4
	20	64.1	64.1	64.1	64.1
	21	52.0	52.0	52.0	52.0

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	22	48.2	48.2	48.2	48.2
	23	52.0	52.0	52.0	52.0
	24	63.4	63.4	63.4	63.4
	25	71.0	71.0	71.0	71.0
	26	64.1	64.1	64.1	64.1
	27	57.3	57.3	57.3	57.3
	28	55.0	55.0	55.0	55.0
External Load					
Days to wheel load		30	30	30	30
Wheel Load		9000	9000	9000	9000
Wheel base radius		6	6	6	6
Modulus of Subgrade		300	300	300	300
Wheel Load Stress					
Iteration Control					
Maximum Iterations		100	100	100	100
Tolerance		5	5	5	5
Concrete Properties					
28 Tensile Strength		572	572	572	572
28 Elastic Modulus		5010000	5010000	5010000	5010000
28 Shrinkage		0.00016	0.00016	0.00016	0.00016
28 Compresive Strength		7095	7095	7095	7095
Aggregate Type		7	7	7	7
Slab-base Friction					
Friction force		4	4	4	4
Slab movement		-0.06	-0.06	-0.06	-0.06
Fatigue Information					
Flexural Strength		790	790	790	790
A coeff.		400000	400000	400000	400000
B coeff.		4	4	4	4
Variation %		30	30	30	30

APPENDIX C. TEMPERATURE CORRELATION DATA

This appendix presents the data used to develop the air-concrete temperature correlation discussed in Chapter 3. The concrete temperature data correspond to values collected during early-age monitoring of the winter test sections (columns to the right). The data in the first column (Weather Bureau) are the corresponding values reported by the U.S. Weather Bureau from the Houston International Airport, the weather station closest to the test sections. The numbers in columns 2 through 8 represent slab temperature readings that occurred in the various test sections when the air temperature was at the value shown in column 1. All values are in °F.

Weather Bureau Temperature °F	Concrete Pavement Measured Temperatures °F						
59					70	68	72
62					69	69	72
66					69	68	71
67					69	69	71
70					71	72	73
74					74	75	75
77					76	77	77
77					77	77	78
73					76	75	77
72					75	74	75
71					73	73	74
69					73	72	74
65	75	79	83	81	72	72	72
67	75	78	81	80	72	70	72
69					72	71	72
72	77	79	82	79			
80	83	84	88	85	79	80	79
81	83	83	85	82	80	80	80
75	80	81	83	80	78	77	78
70	73	73	73	72	72	71	71
83	83	83	87	84	81	82	79
74	81	80	82	80	79	79	77
75	80	80	81	80	79	78	79
64	71	70	70	70	72	70	72
59	69	69	68	68	71	67	70
63	72	73	74	73	75	74	73
61	69	71	69	70	72	69	70
58	67	68	66	66	70	66	68
49	58	58	56	56	60	56	60
47	55	55	53	53	58	54	56
53	63	66	67	65	67	65	63
44	56	57	56	57	55	56	56
44					57	56	56
45	56	57	57	57			

Weather Bureau Temperature °F	Concrete Pavement Measured Temperatures °F						
49					59	58	59
48	58	59	59	59			
47	59	59	59	59	61	59	59
45	54	54	54	54	52	53	54
45	45	46	47	47	46	45	46
69	65	65	67	65	68	67	65
42	48	48	48	49	50	48	48
41	47	47	47	46	49	47	49
45	44	45	45	45	47	45	43
65	60	60	63	62	61	62	60
50	60	61	60	60	65	63	62
46	52	54	56	52	55	56	54
32	42	42	43	43	43	42	43
53	69						
52	68						
62	77						
60	71						
44	62						
40	60						
37	58						
36	57	61	64				
45	54	58	61				
55	67	65	67				
56	70	69	72				
50	64	63	64				
49	63	63	65				
48	62	62	64				
52	61	61	68				
60					78	72	
63					79	73	
70	68	68	66				
73					85	79	
74					86	80	
67					82	76	
61					76	72	
62					75	71	
63					74	71	
64					74	71	
69	66	66	69				
71					73	71	
70					74	72	
67					71	69	
66					70	68	
68					70	68	
69					69	68	
69					70	69	
69					70	69	
71					71	70	
74					73	72	
73					72	71	
74					70	70	
70					70	69	
70					70	69	
70					69	69	

Weather Bureau Temperature °F	Concrete Pavement Measured Temperatures °F				
70				68	69
70				68	68
72	69	68	68		
73				72	72
71				71	71
69				69	68
70				67	67
70	69	69	60		
72				69	69
53				62	61
52				61	61
55	60	59	64		
56				59	60
58				63	63
56				60	61
48				54	53
46				53	55
45				55	54
47				60	59
38				52	53
67	81			80		
68	80			81		
65	76			76	65	63
57	71			71		
53	70			69		
50	66			66		
51	65			65		
52					55	55
54	65			64		
56	65			64		
67	72			72		
75	77			76		
73	76			75		
68	71			71		
66	71			71		
66	70			69		
67	69			68		
67					63	63
65	69			68		
62	67			66		
64	66			66		
66	63			62		
47	59			57		
45	57			70	53	53
46	55			55		
54	64		64			
55	66			64		
41	56			56		
34	53			52		
34	47			48		
50	51			51		
54	56			55	53	54
69	64					
71				67		

APPENDIX D. MEASURED CRACK SPACING DATA

This appendix presents the crack spacing data for the test sections. The crack locations were measured with a "roll-a-tape" starting from the transition zone of each test section (in the direction of traffic). Whenever a crack was spotted, a white mark was painted either on the shoulder or on the curve. The following information is presented for each test section:

(1) First column: "Crack Stations" presents the readings from the "roll-a-tape" in feet. The negative numbers correspond to the first 15-ft transition zone.

(2) Second column: "Observation Date" refers to the crack data at first observance (occurrence day). These data were not available for the project placed in the summer.

(3) Third column: "Crack Spacing" refers to the difference between the adjacent crack stations; that is, it presents the "slab length."

SH-6 s Section A		Section B		Section C		Secton D	
Crack Stations	Crack Spacing	Crack Stations	Crack Spacing	Crack Stations	Crack Spacing	Crack Stations	Crack Spacing
-9.9		-11.0		-9.3		-12.6	
0.1	10.0	-6.3	4.7	-3.9	5.4	-9.3	3.3
4.6	4.5	-5.1	1.2	-2.1	1.8	-5.0	4.3
5.4	0.8	-3.1	2.0	-1.5	0.6	-2.2	2.8
8.3	2.9	0.6	3.7	5.0	6.5	0.0	2.2
9.2	0.9	6.0	5.4	9.0	4.0	1.5	1.5
12.5	3.3	10.2	4.2	11.0	2.0	7.5	6.0
15.2	2.7	11.6	1.4	12.3	1.3	10.6	3.1
25.9	10.7	12.6	1.0	20.0	7.7	14.4	3.8
28.3	2.4	15.5	2.9	26.7	6.7	20.3	5.9
36.0	7.7	16.6	1.1	28.2	1.5	30.8	10.5
38.4	2.4	18.5	1.9	34.3	6.1	32.2	1.4
40.9	2.5	20.9	2.4	42.6	8.3	38.0	5.8
43.3	2.4	23.1	2.2	44.4	1.8	46.6	8.6
44.3	1.0	25.6	2.5	50.4	6.0	52.6	6.0
45.9	1.6	26.6	1.0	54.5	4.1	57.2	4.6
47.7	1.8	28.2	1.6	60.9	6.4	59.9	2.7
49.3	1.6	30.8	2.6	69.7	8.8	61.1	1.2
52.8	3.5	33.8	3.0	70.6	0.9	63.3	2.2
56.8	4.0	40.7	6.9	76.7	6.1	65.9	2.6
61.2	4.4	42.6	1.9	82.4	5.7	67.3	1.4
65.2	4.0	49.5	6.9	85.0	2.6	68.4	1.1
69.6	4.4	50.2	0.7	88.5	3.5	70.0	1.6
71.0	1.4	53.9	3.7	90.8	2.3	71.5	1.5
73.9	2.9	54.7	0.8	92.6	1.8	73.3	1.8
74.4	0.5	60.7	6.0	97.4	4.8	81.4	8.1
76.6	2.2	66.4	5.7	106.6	9.2	83.4	2.0
84.0	7.4	69.0	2.6	107.1	0.5	85.5	2.1
88.3	4.3	71.2	2.2	113.8	6.7	89.1	3.6
89.5	1.2	74.0	2.8	123.4	9.6	89.8	0.7
91.3	1.8	76.2	2.2	125.0	1.6	91.6	1.8
93.3	2.0	82.6	6.4	127.4	2.4	96.5	4.9
94.3	1.0	83.5	0.9	133.6	6.2	98.0	1.5
95.1	0.8	84.9	1.4	139.1	5.5	100.1	2.1
95.8	0.7	86.1	1.2	142.6	3.5	109.6	9.5
97.2	1.4	89.7	3.6	148.3	5.7	110.3	0.7
98.6	1.4	95.0	5.3	151.3	3.0	117.1	6.8
99.7	1.1	98.9	3.9	167.9	16.6	121.6	4.5
101.4	1.7	101.5	2.6	169.0	1.1	123.2	1.6
102.9	1.5	104.0	2.5	174.3	5.3	125.9	2.7
104.4	1.5	106.5	2.5	175.7	1.4	127.9	2.0

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105.7	1.3	110.1	3.6	181.5	5.8	134.3	6.4
107.6	1.9	111.2	1.1	186.7	5.2	138.5	4.2
109.1	1.5	112.8	1.6	187.1	0.4	145.0	6.5
111.3	2.2	118.2	5.4	187.4	0.3	151.0	6.0
114.5	3.2	121.7	3.5	188.5	1.1	154.7	3.7
117.2	2.7	124.0	2.3	190.0	1.5	167.1	12.4
120.9	3.7	127.2	3.2	195.5	5.5	170.4	3.3
122.9	2.0	130.1	2.9	198.0	2.5	175.7	5.3
124.6	1.7	136.1	6.0	204.8	6.8	185.9	10.2
127.2	2.6	139.7	3.6	206.4	1.6	188.2	2.3
128.3	1.1	141.5	1.8	210.3	3.9	190.3	2.1
129.5	1.2	149.7	8.2			193.4	3.1
131.1	1.6	151.9	2.2			195.8	2.4
132.3	1.2	152.7	0.8			197.7	1.9
134.1	1.8	156.9	4.2			199.0	1.3
141.0	6.9	158.6	1.7			203.7	4.7
145.4	4.4	165.6	7.0			204.7	1.0
148.1	2.7	168.8	3.2			215.0	10.3
153.9	5.8	170.4	1.6				
160.3	6.4	171.5	1.1				
161.3	1.0	173.0	1.5				
162.2	0.9	174.3	1.3				
164.3	2.1	176.4	2.1				
165.4	1.1	179.4	3.0				
168.9	3.5	184.0	4.6				
170.2	1.3	189.4	5.4				
170.8	0.6	192.7	3.3				
176.0	5.2	194.7	2.0				
177.5	1.5	201.3	6.6				
181.3	3.8	212.3	11.0				
185.5	4.2						
189.9	4.4						
193.4	3.5						
194.9	1.5						
196.1	1.2						
198.0	1.9						
199.5	1.5						
201.2	1.7						
205.5	4.3						
208.9	3.4						
212.5	3.6						
215.4	2.9						
Average	2.6	Average	3.0	Average	4.4	Average	3.9
Stdev	1.9	Stdev	1.8	Stdev	3.2	Stdev	2.8

Section E		Section F		Section G		Section H	
Crack Stations	Crack Spacing	Crack Stations	Crack Spacing	Crack Stations	Crack Spacing	Crack Stations	Crack Spacing
-10.8		-9.1		-11.2		-10.6	
-5.1	5.7	-2.1	7.0	-8.8	2.4	-2.0	8.6
5.3	10.4	9.6	11.7	-6.4	2.4	8.9	10.9
10.3	5.0	15.0	5.4	-4.3	2.1	10.0	1.1
11.8	1.5	16.5	1.5	3.4	7.7	15.8	5.8
17.0	5.2	17.8	1.3	6.1	2.7	18.4	2.6
25.2	8.2	28.5	10.7	7.8	1.7	20.0	1.6
34.4	9.2	34.4	5.9	16.4	8.6	21.4	1.4
37.7	3.3	41.8	7.4	23.3	6.9	23.0	1.6
38.1	0.4	50.7	8.9	27.2	3.9	29.7	6.7
39.1	1.0	56.0	5.3	40.0	12.8	40.0	10.3
49.8	10.7	60.8	4.8	43.0	3.0	48.2	8.2
53.0	3.2	66.0	5.2	51.3	8.3	56.4	8.2
61.6	8.6	77.0	11.0	57.1	5.8	59.2	2.8
62.6	1.0	78.4	1.4	61.3	4.2	61.1	1.9
68.5	5.9	80.6	2.2	62.2	0.9	72.5	11.4
76.2	7.7	81.5	0.9	65.6	3.4	76.4	3.9
83.9	7.7	82.0	0.5	66.9	1.3	78.4	2.0
86.4	2.5	93.7	11.7	69.9	3.0	80.6	2.2
91.7	5.3	98.2	4.5	78.7	8.8	88.1	7.5
93.1	1.4	111.1	12.9	83.1	4.4	98.3	10.2
97.3	4.2	117.1	6.0	89.0	5.9	99.6	1.3
101.4	4.1	121.5	4.4	97.2	8.2	100.7	1.1
110.0	8.6	132.9	11.4	102.0	4.8	103.5	2.8
117.7	7.7	143.2	10.3	107.4	5.4	111.8	8.3
130.7	13.0	152.3	9.1	112.7	5.3	120.3	8.5
134.0	3.3	154.6	2.3	121.8	9.1	123.9	3.6
136.2	2.2	158.0	3.4	124.9	3.1	132.5	8.6
138.6	2.4	166.0	8.0	135.2	10.3	134.0	1.5
149.6	11.0	167.0	1.0	140.1	4.9	136.1	2.1
154.7	5.1	173.9	6.9	142.3	2.2	144.9	8.8
159.0	4.3	179.7	5.8	148.3	6.0	159.2	14.3
166.5	7.5	189.7	10.0	156.4	8.1	176.6	17.4
172.4	5.9	192.9	3.2	164.1	7.7	178.3	1.7
175.9	3.5	195.4	2.5	167.3	3.2	184.3	6.0
180.5	4.6	205.3	9.9	174.8	7.5	191.0	6.7
187.6	7.1	211.0	5.7	182.8	8.0	198.9	7.9
189.8	2.2	211.9	0.9	184.9	2.1	206.4	7.5
198.5	8.7			185.6	0.7	218.5	12.1
202.3	3.8			197.2	11.6		
204.3	2.0			205.3	8.1		
213.2	8.9			210.5	5.2		
Average	5.4	Average	5.8	Average	5.5	Average	5.6
Stdev	3.2	Stdev	3.7	Stdev	3.1	Stdev	4.2

SH-6 w	Section A		Section B		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-11.5	1/12/90		-11.5	11/20/90	
-9.0	1/16/90	2.5	-5.5	1/13/90	6.0
-1.5	1/13/90	7.5	-2.5	1/13/90	3.0
9.8	1/16/90	11.3	4.6	1/13/90	7.1
12.0	1/13/90	2.2	12.4	2/1/90	7.8
23.1	1/12/90	11.1	21.1	1/12/90	8.7
32.0	1/12/90	8.9	25.9	1/13/90	4.8
35.1	11/20/90	3.1	30.9	1/13/90	5.0
42.6	1/12/90	7.5	37.8	1/12/90	6.9
53.7	1/12/90	11.1	44.6	2/1/90	6.8
60.5	1/13/90	6.8	45.1	1/12/90	0.5
65.4	1/12/90	4.9	53.6	1/13/90	8.5
76.3	1/13/90	10.9	62.1	1/12/90	8.5
79.4	11/20/90	3.1	64.2	11/20/90	2.1
81.0	1/13/90	1.6	69.0	1/12/90	4.8
94.4	1/13/90	13.4	79.3	1/13/90	10.3
99.2	1/12/90	4.8	81.3	1/12/90	2.0
100.9	2/13/91	1.7	84.1	1/13/90	2.8
113.0	1/13/90	12.1	89.0	2/13/91	4.9
123.8	1/13/90	10.8	94.9	1/13/90	5.9
125.1	1/12/90	1.3	104.3	1/12/90	9.4
127.6	2/13/91	2.5	106.5	1/13/90	2.2
139.4	2/13/91	11.8	116.2	1/12/90	9.7
141.8	1/13/90	2.4	127.8	1/12/90	11.6
145.3	1/16/90	3.5	130.4	11/20/90	2.6
151.4	2/13/91	6.1	132.2	1/13/90	1.8
152.6	1/16/90	1.2	141.3	1/12/90	9.1
163.8	11/20/90	11.2	144.3	2/13/91	3.0
168.7	1/13/90	4.9	145.0	11/20/90	0.7
171.3	1/13/90	2.6	159.5	11/20/90	14.5
173.9	1/13/90	2.6	165.7	11/20/90	6.2
182.8	1/16/90	8.9	168.8	2/13/91	3.1
189.8	1/13/90	7.0	172.0	1/12/90	3.2
192.4	1/13/90	2.6	180.3	2/1/90	8.3
199.2	1/13/90	6.8	189.0	1/13/90	8.7
206.8	1/16/90	7.6	203.0	1/13/90	14.0
	Average	6.1		Average	5.9
	Stdev	3.9		Stdev	3.5

Section C			Section D		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-13.2	2/13/91		-5.6	2/1/90	
-9.5	1/13/90	3.7	1.5	1/16/90	7.1
-4.5	1/13/90	5.0	8.0	1/16/90	6.5
1.3	11/20/90	5.8	8.7	1/13/90	0.7
5.2	2/13/91	3.9	23.5	1/13/90	14.8
9.5	1/12/90	4.3	37.0	2/13/91	13.5
20.8	2/1/90	11.3	37.7	1/13/90	0.7
21.2	1/13/90	0.4	39.8	2/13/91	2.1
37.7	1/13/90	16.5	47.0	2/13/91	7.2
46.4	2/13/91	8.7	52.0	11/20/90	5.0
54.5	1/13/90	8.1	62.0	11/20/90	10.0
72.2	1/13/90	17.7	68.0	1/16/90	6.0
86.1	2/1/90	13.9	71.6	1/13/90	3.6
95.5	1/13/90	9.4	86.0	1/16/90	14.4
97.3	2/13/91	1.8	86.5	11/20/90	0.5
112.0	11/20/90	14.7	95.2	2/13/91	8.7
117.1	1/13/90	5.1	103.6	1/13/90	8.4
131.5	1/13/90	14.4	105.5	2/1/90	1.9
137.2	2/13/91	5.7	117.6	2/1/90	12.1
148.4	2/1/90	11.2	123.0	2/1/90	5.4
157.0	1/16/90	8.6	124.1	11/20/90	1.1
163.3	11/20/90	6.3	134.1	2/1/90	10.0
175.0	1/13/90	11.7	137.9	2/13/91	3.8
186.4	1/13/90	11.4	141.6	1/13/90	3.7
204.0	1/13/90	17.6	153.0	1/13/90	11.4
			158.4	11/20/90	5.4
			161.0	1/16/90	2.6
			166.6	2/1/90	5.6
			175.3	11/20/90	8.7
			176.4	1/13/90	1.1
			191.0	2/1/90	14.6
			196.0	11/20/90	5.0
			202.0	11/20/90	6.0
			209.0	2/13/91	7.0
			210.0	11/20/90	1.0
			215.0	11/20/90	5.0
	Average	9.3		Average	6.5
	Stdev	4.9		Stdev	4.5

Section E			Section F		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-7.5	2/1/90		0.6	1/22/90	
5.1	11/20/90	12.6	12.7	1/22/90	12.1
20.1	1/22/90	15.0	19.4	2/13/91	6.7
34.0	2/1/90	13.9	30.4	1/22/90	11.0
46.8	1/22/90	12.8	39.2	11/20/90	8.8
61.3	11/20/90	14.5	51.0	2/13/91	11.8
66.4	2/13/90	5.1	62.6	1/22/90	11.6
76.5	1/22/90	10.1	71.0	2/13/91	8.4
92.8	1/22/90	16.3	84.0	1/22/90	13.0
102.7	2/13/90	9.9	97.8	2/13/91	13.8
110.0	1/22/90	7.3	101.4	2/13/91	3.6
121.0	1/22/90	11.0	108.0	11/20/90	6.6
126.8	2/13/90	5.8	119.6	2/13/91	11.6
136.0	1/22/90	9.2	130.8	2/13/91	11.2
144.1	2/13/90	8.1	142.3	1/22/90	11.5
149.6	11/20/90	5.5	159.0	11/20/90	16.7
158.4	11/20/90	8.8	172.0	1/22/90	13.0
166.5	2/13/90	8.1	182.0	11/20/90	10.0
170.0	2/13/90	3.5	187.1	2/13/91	5.1
176.2	1/22/90	6.2	193.0	1/22/90	5.9
189.5	11/20/90	13.3	201.5	11/20/90	8.5
198.0	2/13/90	8.5	210.0	2/13/91	8.5
205.3	2/13/90	7.3			
208.0	11/20/90	2.7			
	Average	9.6		Average	10.1
	Stdev	3.7		Stdev	3.4

Section G			Section H		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-9.7	1/22/90		-9.0	1/22/90	
-2.0	2/13/91	7.7	-2.0	1/22/90	7.0
9.3	11/20/90	11.3	5.0	11/20/90	7.0
12.4	2/13/91	3.1	11.2	2/13/91	6.2
21.9	11/20/90	9.5	22.3	1/22/90	11.1
26.5	1/22/90	4.6	40.5	11/20/90	18.2
38.8	2/14/90	12.3	55.3	11/20/90	14.8
53.0	1/22/90	14.2	63.3	1/22/90	8.0
64.8	1/22/90	11.8	69.0	11/20/90	5.7
71.9	11/20/90	7.1	75.1	2/13/91	6.1
86.0	1/22/90	14.1	84.5	1/22/90	9.4
92.0	11/20/90	6.0	90.0	11/20/90	5.5
104.3	1/22/90	12.3	92.0	1/22/90	2.0
116.7	2/13/91	12.4	102.2	1/22/90	10.2
125.0	11/20/90	8.3	103.3	2/13/91	1.1
141.0	11/20/90	16.0	108.1	2/13/91	4.8
156.3	1/22/90	15.3	110.5	2/13/91	2.4
170.0	1/22/90	13.7	117.0	11/20/90	6.5
181.2	1/22/90	11.2	125.3	2/13/91	8.3
195.4	2/13/91	14.2	127.0	1/22/90	1.7
202.2	1/22/90	6.8	130.0	11/20/90	3.0
209.1	2/13/91	6.9	139.4	2/13/91	9.4
			145.0	1/22/90	5.6
			155.5	2/13/91	10.5
			161.7	1/22/90	6.2
			172.3	1/22/90	10.6
			177.6	2/13/91	5.3
			180.0	2/13/91	2.4
			190.5	2/14/90	10.5
			205.0	11/20/90	14.5
			213.2	2/13/91	8.2
	Average	10.9		Average	7.0
	Stdev	3.9		Stdev	4.4

BW-8	Section A		Section B		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-13.4	2/13/91		-9.9	2/13/91	
-8.6	2/13/91	4.8	-5.6	11/29/89	4.3
-3.2	11/29/89	5.4	6.9	12/5/89	12.5
1.0	12/15/89	4.2	15.0	12/5/89	8.1
3.0	4/2/90	2.0	26.3	11/29/89	11.3
8.1	11/21/90	5.1	30.3	11/29/89	4.0
15.0	12/5/89	6.9	44.5	11/29/89	14.2
20.3	4/2/90	5.3	49.6	11/21/90	5.1
24.8	4/2/90	4.5	51.1	11/21/90	1.5
26.2	11/29/89	1.4	57.6	11/29/89	6.5
34.6	11/29/89	8.4	66.8	12/15/89	9.2
45.0	11/29/89	10.4	73.5	11/29/89	6.7
51.1	12/5/89	6.1	77.4	11/30/89	3.9
60.7	11/29/89	9.6	88.6	12/5/89	11.2
66.0	12/15/89	5.3	93.8	4/2/90	5.2
69.5	12/21/89	3.5	98.2	11/29/89	4.4
71.0	11/29/89	1.5	105.0	12/21/89	6.8
76.6	11/29/89	5.6	115.4	11/30/89	10.4
83.2	4/2/90	6.6	128.5	11/31/89	13.1
88.2	11/29/89	5.0	133.3	11/28/89	4.8
95.0	11/29/89	6.8	138.6	4/2/90	5.3
106.4	11/29/89	11.4	145.8	12/15/89	7.2
113.6	11/29/89	7.2	158.7	11/30/89	12.9
120.6	11/29/89	7.0	170.1	4/2/90	11.4
134.3	11/31/89	13.7	174.4	11/30/89	4.3
146.7	11/29/89	12.4	177.7	4/2/90	3.3
148.6	12/5/89	1.9	180.3	2/13/91	2.6
150.8	12/15/89	2.2	182.7	4/2/90	2.4
154.7	11/29/89	3.9	190.6	12/5/89	7.9
158.6	4/2/90	3.9	202.0	12/5/89	11.4
160.8	4/2/90	2.2	211.0	11/29/89	9.0
165.7	4/2/90	4.9			
169.9	11/29/89	4.2			
177.6	11/30/89	7.7			
189.7	11/29/89	12.1			
190.7	12/21/89	1.0			
200.0	11/29/89	9.3			
207.9	11/21/90	7.9			
209.1	11/21/90	1.2			
212.2	11/28/89	3.1			
	Average	6.0		Average	7.1
	Stdev	3.4		Stdev	3.6

Section C			Section D		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-12.8	12/21/89		-9.3	11/29/89	
-8.5	11/29/89	4.3	-3.0	12/21/89	6.3
0.2	12/21/89	8.7	4.5	11/30/89	7.5
1.6	12/15/89	1.4	8.3	4/2/90	3.8
9.7	11/28/89	8.1	15.2	11/30/89	6.9
21.6	11/29/89	11.9	16.8	11/21/90	1.6
30.2	11/29/89	8.6	18.8	4/2/90	2.0
44.4	11/31/89	14.2	21.7	11/21/90	2.9
54.3	12/21/89	9.9	27.2	12/5/89	5.5
58.4	11/29/89	4.1	35.6	11/28/89	8.4
66.1	11/30/89	7.7	44.6	12/5/89	9.0
78.3	11/28/89	12.2	49.2	12/21/89	4.6
80.5	12/21/89	2.2	56.0	12/21/89	6.8
97.3	11/28/89	16.8	63.5	11/29/89	7.5
105.1	11/31/89	7.8	71.5	12/5/89	8.0
118.8	11/28/89	13.7	85.4	12/15/89	13.9
132.6	11/29/89	13.8	87.5	11/31/89	2.1
134.7	12/21/89	2.1	97.3	12/5/89	9.8
136.9	11/29/89	2.2	103.0	2/13/91	5.7
152.7	11/29/89	15.8	106.4	11/28/89	3.4
162.8	11/29/89	10.1	117.4	11/30/89	11.0
170.0	12/21/89	7.2	121.2	2/13/91	3.8
171.0	2/13/91	1.0	128.1	11/30/89	6.9
174.0	2/13/91	3.0	144.0	12/5/89	15.9
181.5	11/28/89	7.5	147.6	11/28/89	3.6
191.6	11/29/89	10.1	156.2	4/2/90	8.6
199.9	11/29/89	8.3	163.7	11/29/89	7.5
201.7	11/21/90	1.8	172.8	11/30/89	9.1
210.0	2/13/91	8.3	179.2	11/21/90	6.4
211.1	11/31/89	1.1	186.1	11/31/89	6.9
			197.9	11/31/89	11.8
			204.1	12/15/89	6.2
			211.0	12/5/89	6.9
	Average	8.3		Average	6.9
	Stdev	4.8		Stdev	3.5

Section E			Section F		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-10.0	11/30/89		-9.5	11/21/90	
-3.8	11/21/90	6.2	1.7	11/30/89	11.2
5.4	11/30/89	9.2	9.9	12/8/89	8.2
15.9	11/30/89	10.5	19.2	4/2/90	9.3
25.2	12/21/89	9.3	31.9	11/29/89	12.7
26.5	2/13/91	1.3	33.1	2/13/91	1.2
30.0	11/30/89	3.5	42.0	4/2/90	8.9
36.2	4/2/90	6.2	52.5	11/30/89	10.5
43.8	11/31/89	7.6	63.2	12/15/89	10.7
54.1	11/21/90	10.3	76.1	12/21/89	12.9
63.1	11/30/89	9.0	91.5	11/30/89	15.4
68.6	4/2/90	5.5	94.3	4/2/90	2.8
70.5	12/15/89	1.9	107.5	11/30/89	13.2
79.0	12/15/89	8.5	120.3	11/28/89	12.8
84.5	11/30/89	5.5	126.0	12/15/89	5.7
96.2	12/15/89	11.7	136.3	11/30/89	10.3
106.0	12/5/89	9.8	141.3	12/21/89	5.0
114.5	11/29/89	8.5	143.9	11/30/89	2.6
120.7	4/2/90	6.2	158.0	11/30/89	14.1
128.7	11/30/89	8.0	170.0	12/5/89	12.0
137.6	12/5/89	8.9	182.0	11/30/89	12.0
151.6	11/30/89	14.0	186.7	11/21/90	4.7
163.9	12/5/89	12.3	190.7	4/2/90	4.0
172.1	11/28/89	8.2	200.0	11/28/89	9.3
177.3	12/21/89	5.2	209.8	12/5/89	9.8
183.6	12/15/89	6.3			
194.0	12/5/89	10.4			
201.2	12/21/89	7.2			
202.8	2/13/91	1.6			
214.0	12/8/89	11.2			
217.9	11/21/90	3.9			
	Average	7.9		Average	9.0
	Stdev	3.1		Stdev	4.2

Section G			Section H		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-8.2	11/21/90		-5.0	12/21/89	
0.8	11/30/89	9.0	-3.2	12/21/89	1.8
8.4	12/21/89	7.6	2.8	11/30/89	6.0
9.9	2/13/91	1.5	6.8	12/21/89	4.0
18.0	11/30/89	8.1	11.3	4/2/90	4.5
24.7	12/5/89	6.7	17.5	11/29/89	6.2
34.0	12/21/89	9.3	19.3	11/30/89	1.8
36.4	11/28/89	2.4	32.3	12/21/89	13.0
47.8	11/21/90	11.4	35.6	11/29/89	3.3
49.4	11/30/89	1.6	41.1	12/21/89	5.5
52.8	11/31/89	3.4	50.0	11/30/89	8.9
60.8	12/21/89	8.0	56.8	12/21/89	6.8
63.8	12/21/89	3.0	62.6	12/5/89	5.8
67.0	11/29/89	3.2	70.9	12/5/89	8.3
76.2	4/2/90	9.2	78.5	12/21/89	7.6
78.3	11/30/89	2.1	85.3	11/28/89	6.8
82.5	4/2/90	4.2	94.7	12/21/89	9.4
91.2	12/5/89	8.7	105.4	11/29/89	10.7
94.1	4/2/90	2.9	112.0	12/21/89	6.6
102.0	12/5/89	7.9	120.0	11/30/89	8.0
111.0	12/8/89	9.0	126.8	12/21/89	6.8
121.4	11/28/89	10.4	132.5	12/21/89	5.7
135.2	11/29/89	13.8	134.4	11/31/89	1.9
143.7	4/2/90	8.5	136.6	11/30/89	2.2
147.9	4/2/90	4.2	143.9	12/21/89	7.3
149.0	11/29/89	1.1	148.0	11/30/89	4.1
152.0	2/13/91	3.0	155.1	11/21/90	7.1
160.6	12/5/89	8.6	165.6	11/30/89	10.5
164.2	12/21/89	3.6	172.2	12/21/89	6.6
168.1	11/31/89	3.9	179.1	11/30/89	6.9
171.9	2/13/91	3.8	188.9	4/2/90	9.8
176.5	12/21/89	4.6	192.0	11/29/89	3.1
183.4	11/29/89	6.9	193.2	12/21/89	1.2
186.0	12/21/89	2.6	205.0	11/30/89	11.8
193.4	4/2/90	7.4			
200.1	12/5/89	6.7			
203.1	11/29/89	3.0			
211.2	11/21/90	8.1			
214.0	12/5/89	2.8			
215.2	11/21/90	1.2			
	Average	5.9		Average	6.3
	Stdev	3.2		Stdev	2.8

IH-45	Section A		Section B		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-14.7	11/21/90		-12.4	1/21/90	
-4.9	1/26/90	9.8	-4.1	2/13/91	8.3
6.2	1/26/90	11.1	-3.4	2/13/91	0.7
7.5	2/13/91	1.3	-0.3	1/22/90	3.1
16.5	11/21/90	9.0	5.2	1/26/90	5.5
21.2	2/13/91	4.7	7.6	1/20/90	2.4
24.3	1/26/90	3.1	8.2	2/13/91	0.6
26.5	2/13/91	2.2	10.9	2/13/91	2.7
27.4	2/13/91	0.9	16.9	1/22/90	6.0
32.8	1/31/90	5.4	22.6	1/26/90	5.7
38.2	11/21/90	5.4	28.0	1/21/90	5.4
41.1	1/25/90	2.9	30.9	2/13/91	2.9
52.3	1/31/90	11.2	33.5	1/20/90	2.6
53.0	1/22/90	0.7	36.4	1/22/90	2.9
59.0	2/13/91	6.0	42.0	2/13/91	5.6
63.7	1/26/90	4.7	43.2	2/13/91	1.2
66.7	1/26/90	3.0	45.0	2/13/91	1.8
72.2	1/21/90	5.5	47.5	1/20/90	2.5
82.9	1/20/90	10.7	55.0	2/13/91	7.5
83.5	2/13/91	0.6	59.2	2/13/91	4.2
85.3	1/20/90	1.8	65.8	1/20/90	6.6
86.4	2/13/91	1.1	73.1	1/21/90	7.3
91.8	1/22/90	5.4	75.9	1/21/90	2.8
94.8	1/22/90	3.0	84.1	2/13/91	8.2
98.0	1/22/90	3.2	84.9	11/21/90	0.8
108.9	2/13/91	10.9	89.7	1/20/90	4.8
111.9	1/20/90	3.0	98.5	2/13/91	8.8
114.5	1/21/90	2.6	99.8	1/31/90	1.3
117.6	1/21/90	3.1	102.0	1/22/90	2.2
129.2	11/21/90	11.6	104.3	2/13/91	2.3
133.9	1/21/90	4.7	110.0	1/22/90	5.7
142.8	2/13/91	8.9	117.7	2/13/91	7.7
147.8	2/13/91	5.0	118.4	1/21/90	0.7
148.9	1/20/90	1.1	118.8	11/21/90	0.4
149.2	1/12/90	0.3	121.3	2/13/91	2.5
150.4	2/13/91	1.2	127.0	1/20/90	5.7
151.2	2/13/91	0.8	137.2	2/13/91	10.2
156.9	1/22/90	5.7	138.5	2/13/91	1.3
167.2	2/13/91	10.3	142.9	1/22/90	4.4
168.9	1/20/90	1.7	149.4	11/21/90	6.5
170.8	1/21/90	1.9	154.1	1/26/90	4.7

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173.7	1/31/90	2.9	159.0	1/22/90	4.9
182.2	2/13/91	8.5	160.7	1/20/90	1.7
183.0	1/21/90	0.8	166.6	1/22/90	5.9
190.7	1/26/90	7.7	169.2	1/22/90	2.6
193.6	2/13/91	2.9	172.0	1/20/90	2.8
197.7	1/20/90	4.1	178.3	11/21/90	6.3
199.4	2/13/91	1.7	185.0	1/22/90	6.7
201.7	1/22/90	2.3	193.9	11/21/90	8.9
204.6	1/22/90	2.9	200.0	1/20/90	6.1
207.5	2/13/91	2.9	203.0	1/22/90	3.0
215.0	11/21/90	7.5	205.8	1/26/90	2.8
			211.7	2/13/91	5.9
	Average	4.3		Average	4.3
	Stdev	3.3		Stdev	2.6

Section C			Section D		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-11.1	1/26/90		-8.2	11/21/90	
-6.2	2/13/91	4.9	-5.0	1/20/90	3.2
-0.6	1/21/90	5.6	-2.5	1/22/90	2.5
5.0	2/13/91	5.6	-0.6	1/20/90	1.9
8.0	1/20/90	3.0	12.6	1/21/90	13.2
10.9	2/13/91	2.9	13.7	2/13/91	1.1
17.0	11/21/90	6.1	22.0	2/13/91	8.3
25.4	1/20/90	8.4	25.1	1/26/90	3.1
30.9	11/21/90	5.5	26.5	1/20/90	1.4
33.6	1/26/90	2.7	33.5	2/13/91	7.0
36.3	1/21/90	2.7	38.2	1/22/90	4.7
42.1	2/13/91	5.8	39.0	2/13/91	0.8
45.7	1/21/90	3.6	44.6	2/13/91	5.6
53.4	2/13/91	7.7	49.5	1/22/90	4.9
54.4	2/13/91	1.0	50.5	1/25/90	1.0
61.7	1/22/90	7.3	56.3	1/20/90	5.8
64.8	1/20/90	3.1	58.7	1/22/90	2.4
75.8	11/21/90	11.0	61.9	1/26/90	3.2
81.5	1/21/90	5.7	64.7	1/22/90	2.8
84.3	1/21/90	2.8	67.7	1/20/90	3.0
87.5	2/13/91	3.2	70.3	1/20/90	2.6
90.6	2/13/91	3.1	75.9	2/13/91	5.6
96.3	1/20/90	5.7	78.9	2/13/91	3.0
102.0	2/13/91	5.7	82.2	11/21/90	3.3
111.1	1/22/90	9.1	89.2	1/21/90	7.0
115.1	1/26/90	4.0	95.4	1/22/90	6.2
118.2	1/31/90	3.1	101.8	2/13/91	6.4
121.7	2/13/91	3.5	105.4	1/22/90	3.6
126.5	1/21/90	4.8	112.4	1/22/90	7.0
137.6	2/13/91	11.1	115.2	1/26/90	2.8
138.8	1/22/90	1.2	120.4	1/20/90	5.2
146.7	1/21/90	7.9	121.7	2/13/91	1.3
152.1	2/13/91	5.4	129.6	2/13/91	7.9
157.7	1/20/90	5.6	135.5	1/22/90	5.9
160.3	1/22/90	2.6	141.0	2/13/91	5.5
168.8	2/13/91	8.5	142.0	1/26/90	1.0
171.9	1/26/90	3.1	144.3	2/13/91	2.3
174.6	1/20/90	2.7	152.1	1/20/90	7.8
177.6	1/22/90	3.0	154.9	1/20/90	2.8
180.3	2/13/91	2.7	164.0	1/22/90	9.1
185.6	11/21/90	5.3	168.9	2/13/91	4.9

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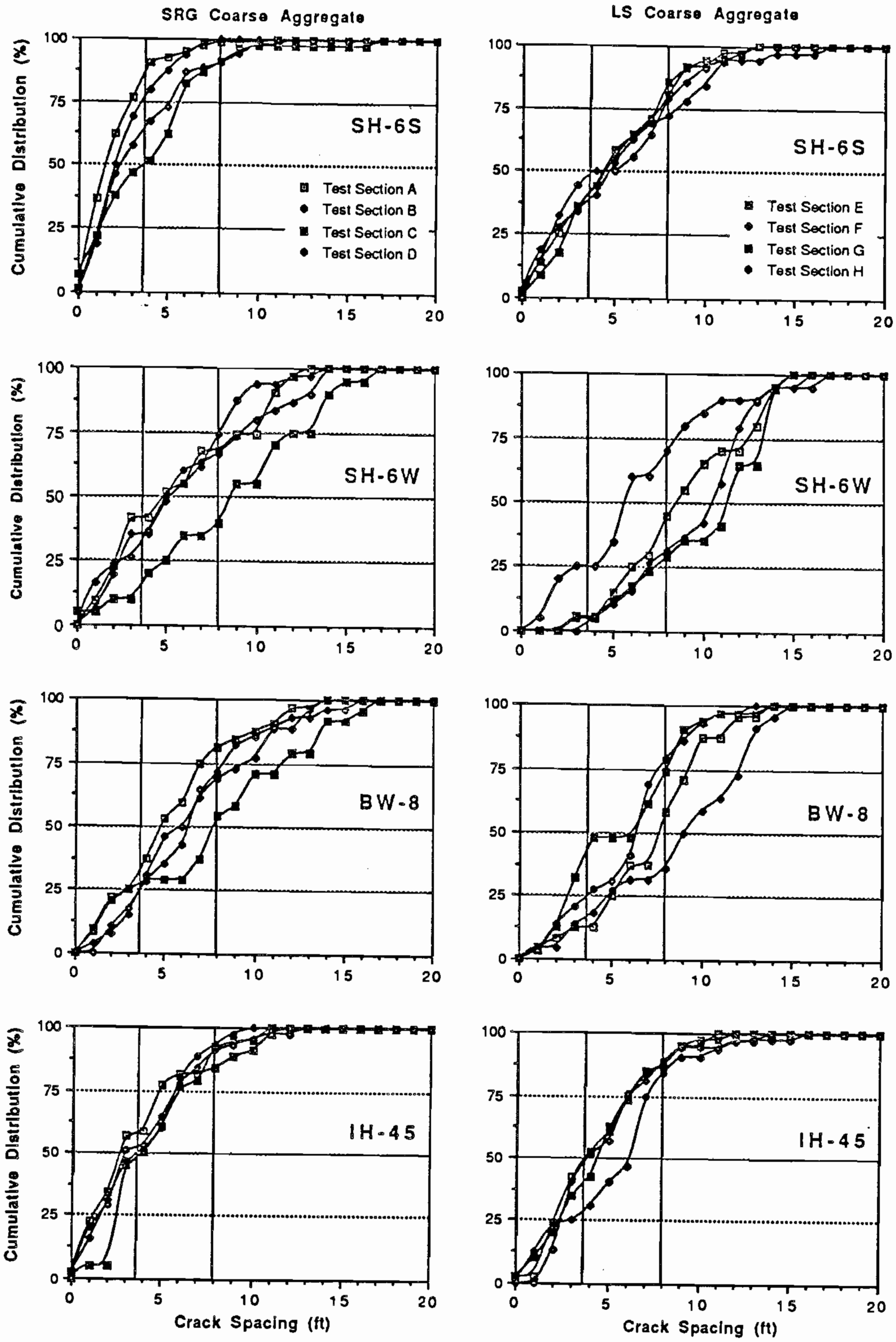
194.0	11/21/90	8.4	170.3	1/20/90	1.4
203.1	2/13/91	9.1	172.0	1/21/90	1.7
208.1	1/22/90	5.0	174.8	1/26/90	2.8
214.9	2/13/91	6.8	176.9	1/21/90	2.1
			177.9	1/26/90	1.0
			188.0	1/22/90	10.1
			189.2	11/21/90	1.2
			200.5	11/21/90	11.3
			205.6	1/23/90	5.1
			208.5	1/23/90	2.9
	Average	5.0		Average	4.5
	Stdev	2.6		Stdev	3.0

Section E			Section F		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-9.6	1/26/90		-11.6	2/13/91	
2.0	1/25/90	11.6	-6.0	1/26/90	5.6
11.5	11/21/90	9.5	3.8	2/13/91	9.8
17.6	11/21/90	6.1	11.2	11/21/90	7.4
26.3	1/31/90	8.7	19.3	2/13/91	8.1
32.8	2/13/91	6.5	21.6	2/13/91	2.3
35.5	2/13/91	2.7	25.5	2/13/91	3.9
37.7	2/13/91	2.2	26.0	2/13/91	0.5
44.9	1/26/90	7.2	26.9	2/13/91	0.9
48.5	2/13/91	3.6	33.9	11/21/90	7.0
59.5	11/21/90	11.0	45.2	2/13/91	11.3
61.2	2/13/91	1.7	51.8	1/31/90	6.6
64.7	11/21/90	3.5	52.9	1/31/90	1.1
72.6	2/13/91	7.9	57.7	11/21/90	4.8
76.0	11/21/90	3.4	66.3	2/13/91	8.6
78.8	2/13/91	2.8	74.7	11/21/90	8.4
81.4	2/13/91	2.6	77.0	2/13/91	2.3
86.3	11/21/90	4.9	82.2	11/21/90	5.2
93.5	11/21/90	7.2	89.7	1/25/90	7.5
101.0	11/21/90	7.5	99.1	2/13/91	9.4
102.8	2/13/91	1.8	103.8	2/13/91	4.7
108.2	1/26/90	5.4	104.9	11/21/90	1.1
111.1	2/13/91	2.9	116.8	2/13/91	11.9
113.8	2/13/91	2.7	124.0	1/26/90	7.2
119.7	2/13/91	5.9	130.1	2/13/91	6.1
124.6	2/13/91	4.9	137.1	2/13/91	7.0
125.6	2/13/91	1.0	140.5	1/25/90	3.4
134.2	2/13/91	8.6	149.0	11/21/90	8.5
139.8	11/21/90	5.6	163.2	11/21/90	14.2
151.0	2/13/91	11.2	168.8	1/26/90	5.6
152.7	11/21/90	1.7	172.7	2/13/91	3.9
154.9	2/13/91	2.2	179.9	11/21/90	7.2
158.5	2/13/91	3.6	187.1	11/21/90	7.2
160.5	2/13/91	2.0	193.9	2/13/91	6.8
167.5	1/25/90	7.0	197.1	2/13/91	3.2
176.9	2/13/91	9.4	202.8	1/25/90	5.7
178.5	11/21/90	1.6	205.2	2/13/91	2.4
182.6	11/21/90	4.1	214.8	1/26/90	9.6
186.6	1/26/90	4.0			
192.8	11/21/90	6.2			
194.7	2/13/91	1.9			
201.0	1/26/90	6.3			
205.4	11/21/90	4.4			
210.2	2/13/91	4.8			
214.4	2/13/91	4.2			
	Average	4.8		Average	6.0
	Stdev	2.8		Stdev	3.3

Section G			Section H		
Crack Stations	Observation Date	Crack Spacing	Crack Stations	Observation Date	Crack Spacing
-15.2	11/21/90		-10.0	1/26/90	
-11.1	2/13/91	4.1	-5.2	2/13/91	4.8
-5.0	2/13/91	6.1	-4.2	2/13/91	1.0
0.5	2/13/91	5.5	2.1	1/26/90	6.3
2.5	1/26/90	2.0	7.0	2/13/91	4.9
9.3	2/13/91	6.8	12.9	1/25/90	5.9
10.6	2/13/91	1.3	18.4	1/26/90	5.5
16.2	2/13/91	5.6	24.1	2/13/91	5.7
22.0	11/21/90	5.8	30.4	1/25/90	6.3
26.9	2/13/91	4.9	32.7	2/13/91	2.3
33.2	1/26/90	6.3	35.8	2/13/91	3.1
39.9	2/13/91	6.7	44.1	11/21/90	8.3
46.0	1/25/90	6.1	45.7	2/13/91	1.6
58.3	1/25/90	12.3	51.3	2/13/91	5.6
63.3	11/21/90	5.0	57.9	11/21/90	6.6
66.9	2/13/91	3.6	64.8	1/25/90	6.9
69.5	2/13/91	2.6	70.4	2/13/91	5.6
74.7	1/26/90	5.2	73.3	2/13/91	2.9
84.0	2/13/91	9.3	77.3	11/21/90	4.0
86.7	2/13/91	2.7	81.0	1/25/90	3.7
88.7	1/25/90	2.0	90.5	2/13/91	9.5
95.5	1/26/90	6.8	94.6	1/26/90	4.1
97.7	2/13/91	2.2	100.4	2/13/91	5.8
101.7	2/13/91	4.0	103.3	2/13/91	2.9
106.9	1/25/90	5.2	106.4	1/25/90	3.1
112.8	2/13/91	5.9	110.1	2/13/91	3.7
115.5	2/13/91	2.7	126.3	1/25/90	16.2
115.8	2/13/91	0.3	134.6	2/13/91	8.3
123.7	1/25/90	7.9	137.5	2/13/91	2.9
127.2	2/13/91	3.5	140.2	1/31/90	2.7
134.0	2/13/91	6.8	143.0	2/13/91	2.8
138.3	1/26/90	4.3	145.9	1/25/90	2.9
148.4	1/26/90	10.1	148.0	2/13/91	2.1
151.5	2/13/91	3.1	151.1	2/13/91	3.1
154.6	2/13/91	3.1	154.3	1/31/90	3.2
156.1	2/13/91	1.5	162.9	1/25/90	8.6
165.5	2/13/91	9.4	169.0	2/13/91	6.1
170.8	1/26/90	5.3	177.0	1/26/90	8.0
180.3	1/25/90	9.5	188.8	2/13/91	11.8
185.8	2/13/91	5.5	191.1	1/31/90	2.3
186.7	2/13/91	0.9	193.2	2/13/91	2.1
189.1	2/13/91	2.4	202.4	1/26/90	9.2
194.5	1/26/90	5.4	212.3	2/13/91	9.9
202.3	1/25/90	7.8			
210.4	2/13/91	8.1			
212.0	11/21/90	1.6			
	Average	5.0		Average	5.2
	Stdev	2.7		Stdev	3.1

APPENDIX E. CRACK SPACING DISTRIBUTION

This appendix presents the comparison plots corresponding to the crack spacing distribution. The plots at the right present the SRG test sections, while the plots at the left present the LS test sections. At the top of the page, the SH 6S project is presented, followed by SH 6W, BW 8, and IH-45 at the bottom. The horizontal axis presents the crack spacing in feet, and the vertical axis presents the cumulative distribution in percentage.

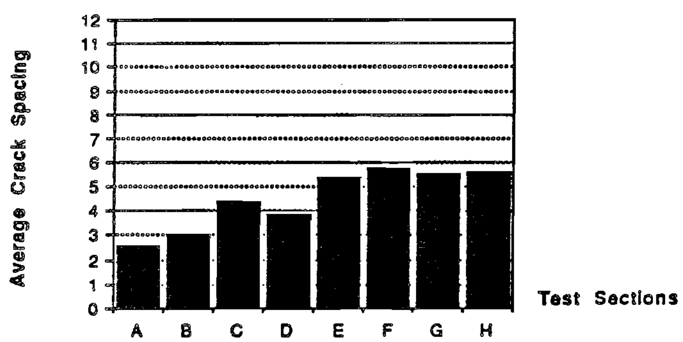


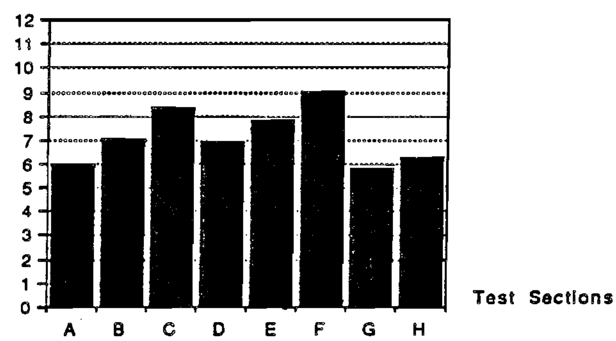
SRG Coarse Aggregate
LS Coarse Aggregate
Cumulative Distribution (%)
SH-6S
SH-6W
BW-8
IH-45
Test Section A
Test Section B
Test Section C
Test Section D
Test Section E
Test Section F
Test Section G
Test Section H
Crack Spacing (ft)

APPENDIX F. CRACK SPACING PER TEST SECTION

This appendix presents comparison plots for the average measured crack spacing by test section and project location. The crack spacing values are in feet.

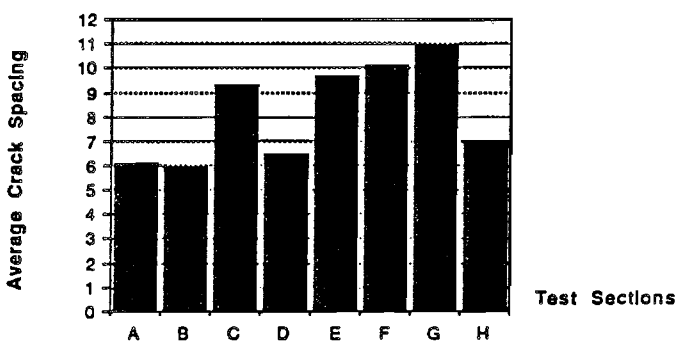
Data from "SH-6S"

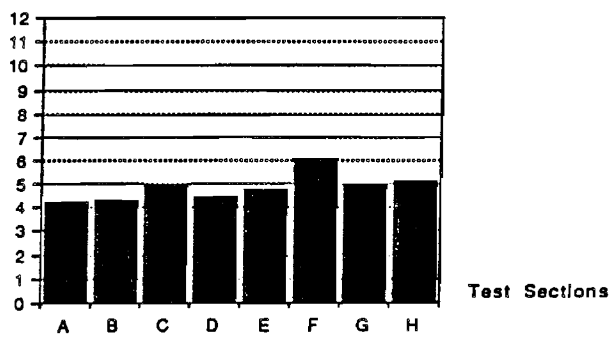




Data from "SH-6W"

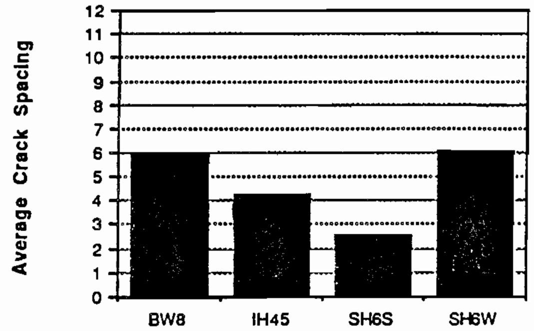
Data from "IH-45"



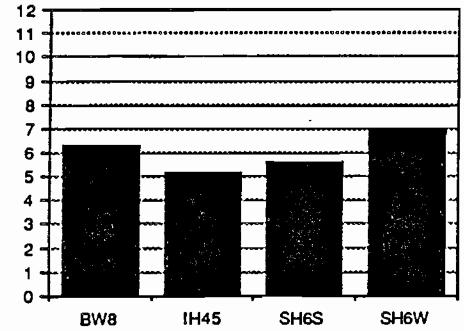


Data from "BW-8"

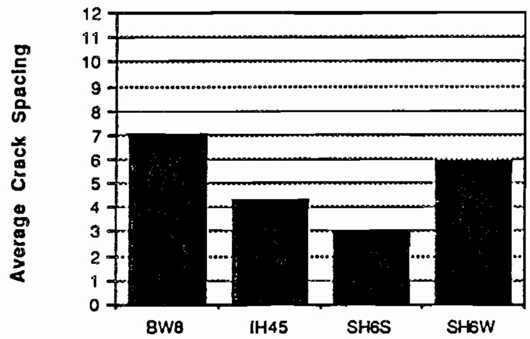
Section A



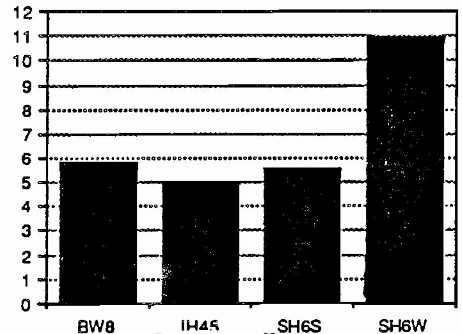
Section H



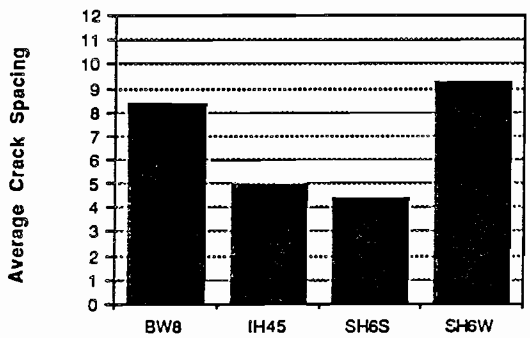
Section B



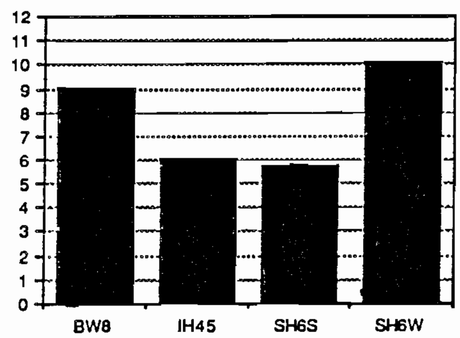
Section G



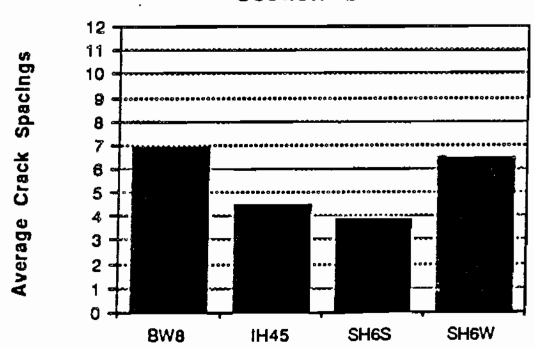
Section C



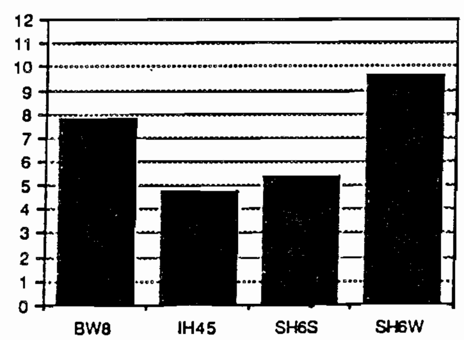
Section F



Section D

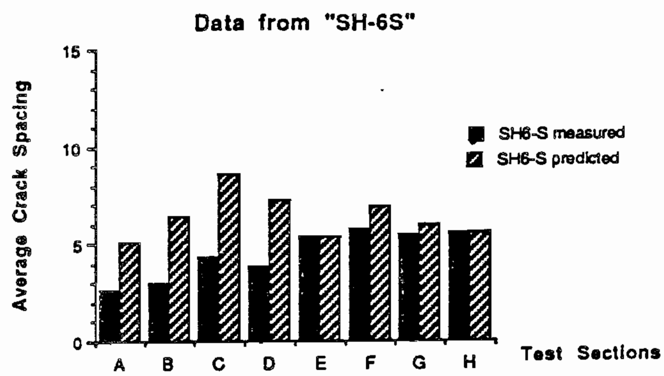


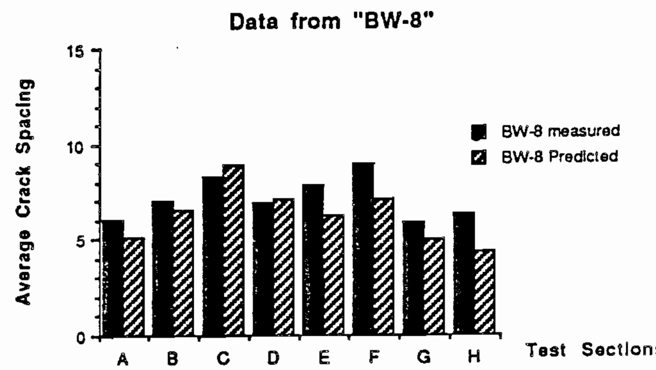
Section E

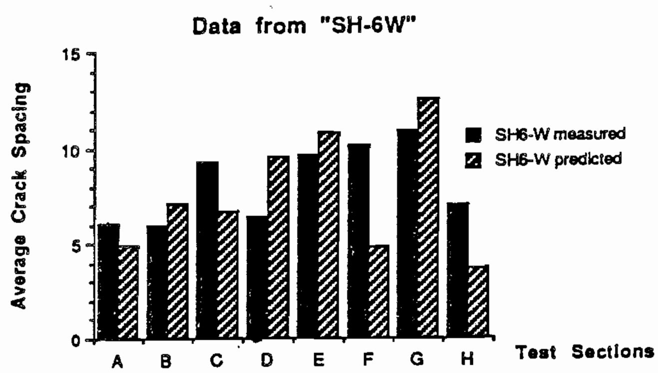


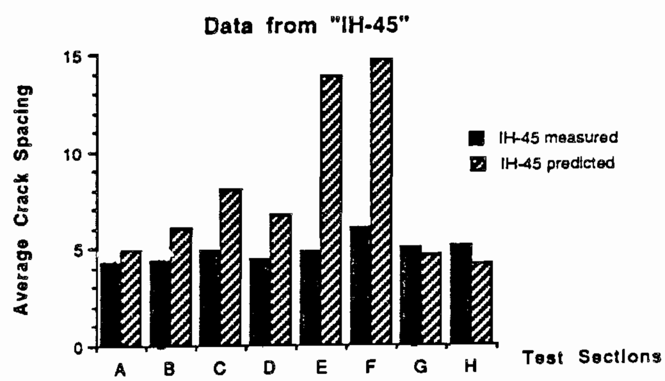
APPENDIX G. MEASURED VERSUS PREDICTED CRACK SPACING

This appendix presents comparison plots of the average measured crack spacings and the predicted average crack spacings "at the end of the analysis period" by the CRCP-7 computer program.









APPENDIX H. MEASURED CRACK WIDTH DATA

This appendix presents the individual measured crack widths for the test sections. Three crack width measurements were made at selected cracks to analyze the crack width variation at each crack. These values are presented in light color. The values in bold type under each set of three measured values correspond to the crack average, and the encased value at the right corresponds to the crack width test section average. The reported temperature is the corrected concrete temperature at the top of the slab at the time the measurements were made.

SH-6 Summer

								average
Section A Temperature: 75.12								
0.013	0.018	0.016	0.019	0.013	0.030	0.018	0.008	
0.016	0.020	0.016					0.007	
	0.019	0.023					0.003	
0.015	**0.019**	**0.018**	**0.019**	**0.013**	**0.030**	**0.018**	**0.006**	**0.017**
Section B Temperature: 71.61								
0.022	0.026	0.023	0.014	0.025	0.013	0.017	0.005	
0.018	0.020	0.030	0.016	0.019	0.021	0.015	0.010	
					0.016			
0.020	**0.023**	**0.027**	**0.015**	**0.022**	**0.017**	**0.016**	**0.008**	**0.018**
Section C Temperature: 72.83								
0.021	0.015	0.015	0.022	0.020	0.023	0.022	0.008	
0.022	0.027	0.018	0.019	0.019		0.022	0.012	
0.022	**0.021**	**0.017**	**0.021**	**0.020**	**0.023**	**0.022**	**0.010**	**0.019**
Section D Temperature: 73.44								
0.022	0.014	0.021	0.014	0.010	0.017			
0.017	0.013	0.023	0.020		0.020			
0.020	**0.014**	**0.022**	**0.017**	**0.010**	**0.019**			**0.017**
Section E Temperature: 64.46								
0.010	0.013	0.012	0.022	0.023				
	0.016							
0.010	**0.015**	**0.012**	**0.022**	**0.023**				**0.016**
Section F Temperature: 70.70								
0.016	**0.016**	**0.013**	**0.016**					**0.015**
Section G Temperature: 72.22								
0.018	**0.009**	**0.010**	**0.015**	**0.017**	**0.014**	**0.013**	**0.025**	**0.015**
Section H Temperature: 77.70								
0.012	**0.017**	**0.016**	**0.016**	**0.016**	**0.022**			**0.017**

SH-6 Winter

Section	Temperature										average
A	57.00	0.025	0.020	0.020	0.012	0.017	0.010	0.032	0.005		0.018
B	57.00	0.020	0.012	0.015	0.020	0.006	0.024	0.017	0.006	0.010	0.014
C	57.00	0.007	0.030	0.006	0.040	0.025	0.034	0.010	0.040	0.028	0.024
D	57.00	0.017	0.015	0.003	0.007	0.020	0.017	0.007	0.014	0.010	0.012
E	61.87	0.010	0.016	0.002	0.010	0.013	0.009	0.004	0.003	0.011	0.009
F	61.87	0.012	0.016	0.010	0.015	0.011	0.002	0.008	0.012	0.002	0.010
G	69.59	0.004	0.009	0.008	0.012	0.012	0.005	0.009	0.010		0.009
H	69.59	0.010	0.010	0.006	0.006	0.001	0.004	0.002	0.010		0.006

BW-8										average
Section A	Temperature: 63.24									
0.012	0.009	0.020	0.009	0.021	0.019	0.014	0.023			
0.011	0.018	0.015	0.012	0.013	0.018	0.020	0.020			
	0.019		0.014	0.017						
0.012	**0.015**	**0.018**	**0.012**	**0.017**	**0.019**	**0.017**	**0.022**			**0.016**
Section B	Temperature: 65.37									
0.010	0.018	0.016	0.015	0.020	0.010	0.015	0.007	0.015		
0.016	0.025	0.006				0.012	0.005			
		0.008								
0.013	**0.022**	**0.010**	**0.015**	**0.020**	**0.010**	**0.014**	**0.006**	**0.015**		**0.014**
Section C	Temperature: 65.37									
0.023	0.030	0.020	0.021	0.021	0.020	0.035	0.005	0.021		
0.025	0.017	0.018	0.014	0.045	0.020	0.028				
	0.012									
0.024	**0.020**	**0.019**	**0.018**	**0.033**	**0.020**	**0.032**	**0.005**	**0.021**		**0.021**
Section D	Temperature: 67.35									
0.013	0.013	0.010	0.006	0.016	0.018	0.022	0.018	0.010		
	0.017	0.016			0.014					
0.013	**0.015**	**0.013**	**0.006**	**0.016**	**0.016**	**0.022**	**0.018**	**0.010**		**0.014**
Section E	Temperature: 72.38									
0.015	0.005	0.014	0.018	0.017	0.017	0.019	0.020	0.003	0.009	
0.015	0.006	0.014	0.019	0.011	0.008	0.020	0.011		0.011	
					0.014					
0.015	**0.006**	**0.014**	**0.019**	**0.014**	**0.013**	**0.020**	**0.016**	**0.003**	**0.010**	**0.013**
Section F	Temperature: 73.75									
0.013	0.003	0.017	0.022	0.020	0.018	0.025	0.013	0.019		
0.014		0.020		0.017	0.014	0.018	0.020	0.020		
0.014	**0.003**	**0.019**	**0.022**	**0.019**	**0.016**	**0.022**	**0.017**	**0.020**		**0.017**

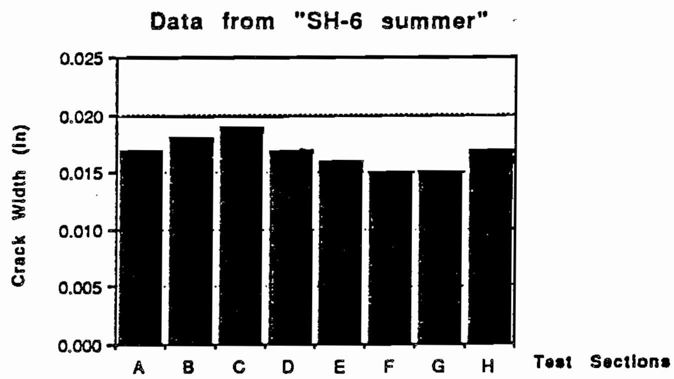
Section G	Temperature: 73.44									
0.004	0.011	0.016	0.015	0.017	0.015	0.010	0.012	0.009	0.002	
0.005	0.017	0.012	0.009		0.012	0.007	0.007	0.010		
0.005	**0.014**	**0.014**	**0.012**	**0.017**	**0.014**	**0.009**	**0.010**	**0.010**	**0.002**	0.010
Section H	Temperature: 72.22									
0.007	0.012	0.011	0.010	0.010	0.007	0.011				
0.013	0.008	0.008	0.007	0.014	0.007		0.010			
0.010	**0.010**	**0.010**	**0.009**	**0.012**	**0.007**	**0.011**	**0.010**			0.010

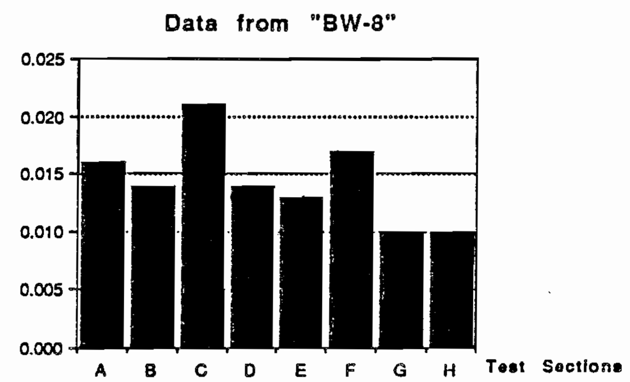
IH-45

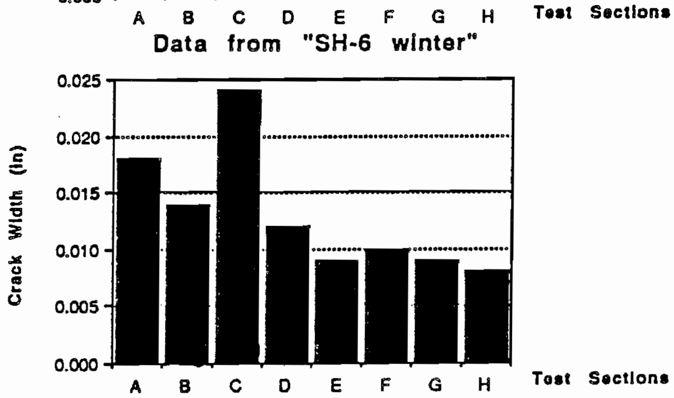
Section A Temperature: 56.39											
0.015	0.014	0.005	0.010	0.010	0.018	0.006	0.002	0.016			0.011
Section B Temperature: 56.39											
0.015	0.023	0.005	0.012	0.001	0.014	0.004	0.018	0.002	0.012		0.011
Section C Temperature: 56.39											
0.005	0.015	0.014	0.007	0.013	0.003	0.017	0.008	0.016			0.011
Section D Temperature: *											
*	*	*	*	*	*	*	*	*	*		*
Section E Temperature: 66.29											
0.010	0.002	0.014	0.002	0.010	0.001	0.010	0.009				0.007
Section F Temperature: 66.29											
0.001	0.001	0.012	0.011	0.015	0.007	0.003					0.007
Section G Temperature: 73.53											
0.003	0.003	0.004	0.003	0.010	0.002	0.007	0.009	0.001			0.005
Section H Temperature: 78.77											
0.005	0.011	0.008	0.008	0.009	0.003	0.002	0.010	0.001			0.006

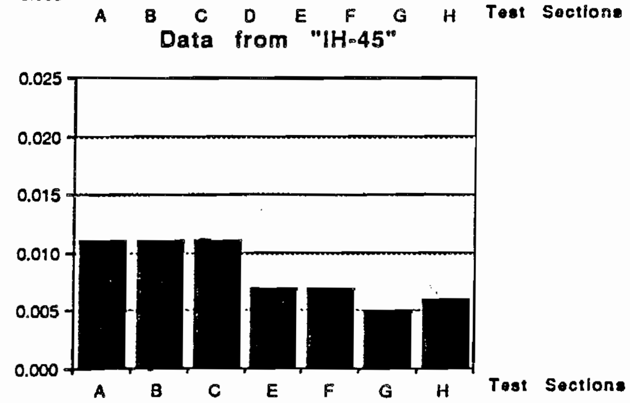
APPENDIX I. MEASURED CRACK WIDTH PER TEST SECTION

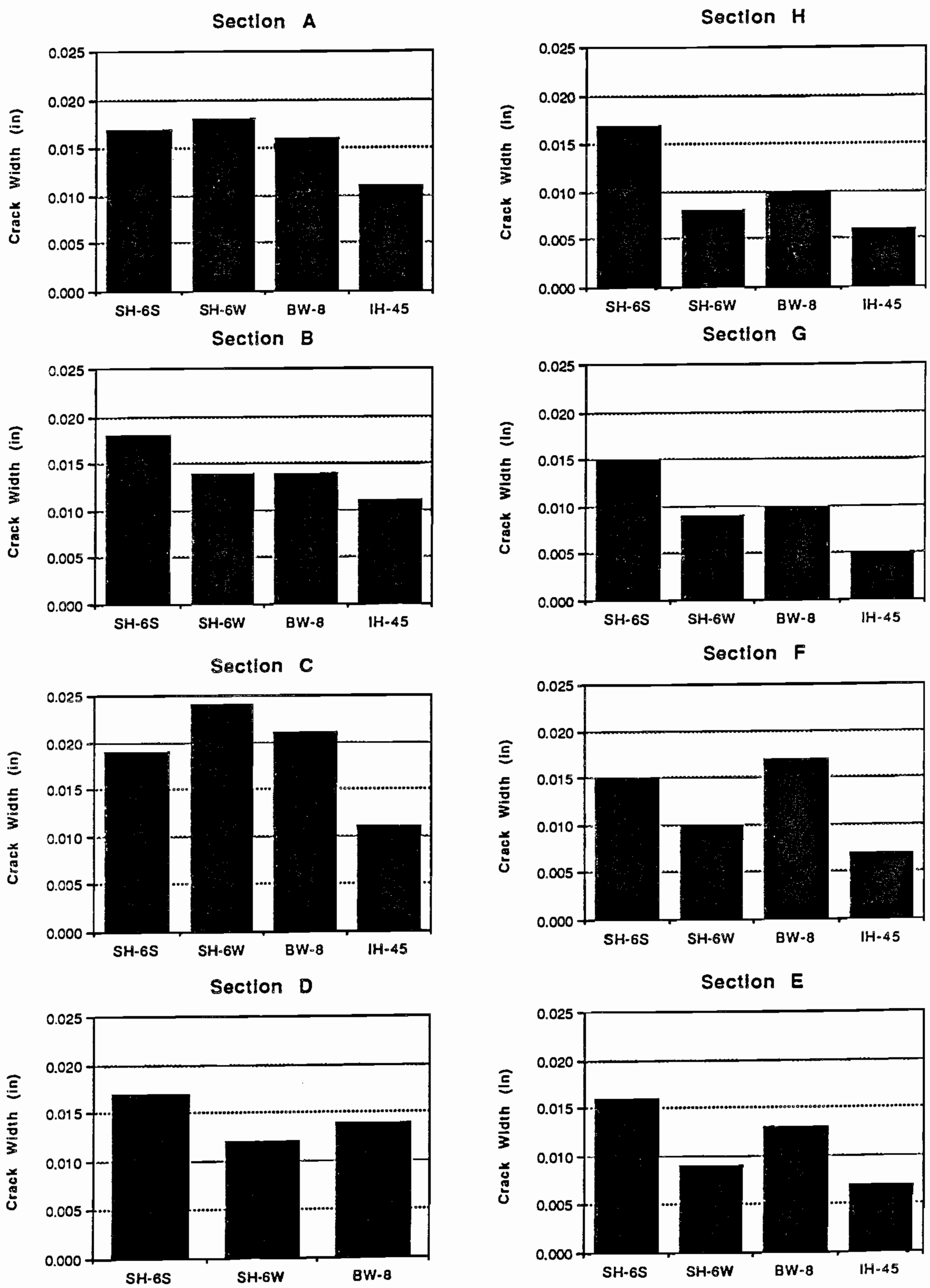
This appendix presents comparison plots of the average measured crack width by test section and project location. The crack width values are in inches.







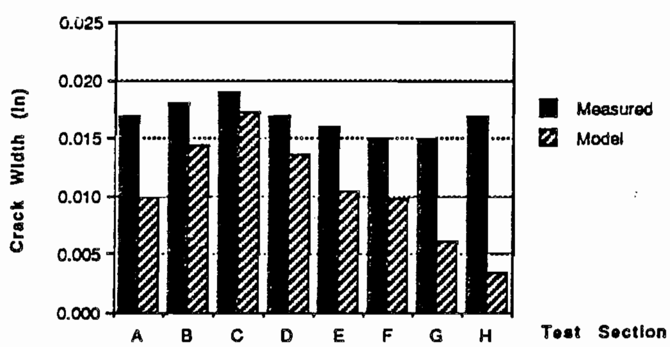



Section A
Section B
Section C
Section D
Section H
Section G
Section F
Section E
Crack Width (in)
0.025
0.020
0.015
0.010
0.005
0.000
SH-6S
SH-6W
BW-8
IH-45

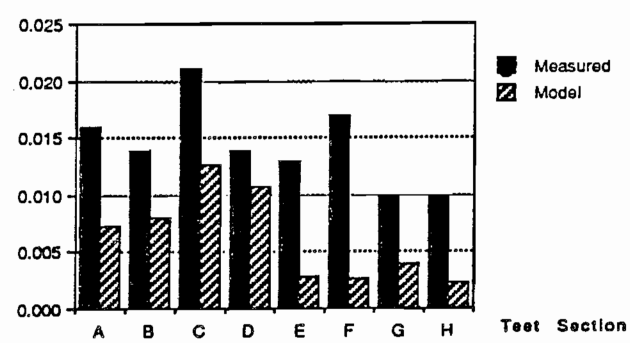
APPENDIX J. OLD CRACK WIDTH MODEL COMPARISON

This appendix presents comparison plots of the average measured crack width and the old CRCP-7 crack width model. The crack width values are in inches.

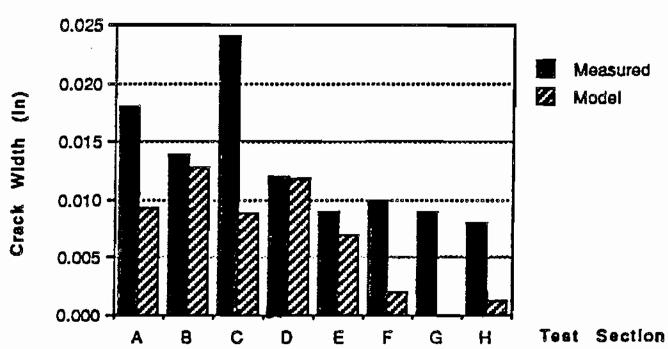
Data from "SH-6 summer"



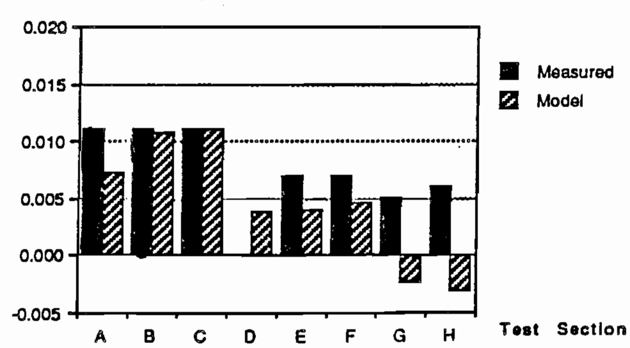
Data from "BW-8"



Data from "SH-6 winter"



Data from "IH-45"



APPENDIX K. CRACK WIDTH REGRESSION ANALYSIS FACTORIAL

This appendix presents the factorial used to calculate the crack width regression analysis model discussed in Chapter 6. The data used herein were collected during the early-age monitoring and during the monitoring 1 year after construction; they include all the variables studied. The data are presented in the following format: **PRO**ject location, test **S**ection, crack **ID** number, coarse **AGG**regate type, field-measured **C**rack **W**idth (inch), **day** of crack occurrence, concrete set **TEMP**erature (°F), δ **temp**erature differential among the set temperature and the temperature at the time of measurement (°F), **Z** effective drying shrinkage (inch/inch/°F), **D** slab thickness (inch), effective slab **L**ength (foot), **A** concrete thermal coefficient (inch/°F), **SOIL** friction, **%** steel percentage, **Ø** reinforcing steel bar diameter (inch), **FT** splitting tensile strength at the day of crack occurrence, and **E**lastic modulus at the day of crack occurrence (10^{-3} psi).

PRO	S	ID	AGG	CW	day	TEMP	∂ temp	Z	D	L	A	SOIL	%	Ø	FT	E
SH-6S	A	A22	SRG	0.014	1	73.3	31.7	6.155E-06	11	10.4	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A22	SRG	0.013	1	73.3	31.7	6.155E-06	11	10.4	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A22	SRG	0.013	1	73.3	31.7	6.155E-06	11	10.4	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A22	SRG	0.012	1	76.1	28.9	6.155E-06	11	10.4	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A22	SRG	0.010	1	96.3	8.7	6.155E-06	11	10.4	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A3	SRG	0.013	1	73.3	31.7	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A3	SRG	0.012	1	73.3	31.7	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A3	SRG	0.011	1	73.3	31.7	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A3	SRG	0.011	1	76.1	28.9	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A3	SRG	0.007	1	96.3	8.7	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.017	1	73.3	31.7	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.015	1	73.3	31.7	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.013	1	73.3	31.7	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.015	1	76.1	28.9	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.007	1	96.3	8.7	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.019	1	73.3	31.7	6.155E-06	11	2.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.018	1	73.3	31.7	6.155E-06	11	2.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.014	1	73.3	31.7	6.155E-06	11	2.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.018	1	76.1	28.9	6.155E-06	11	2.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.009	1	96.3	8.7	6.155E-06	11	2.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A9	SRG	0.018	1	73.3	31.7	6.155E-06	11	2.5	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A9	SRG	0.018	1	73.3	31.7	6.155E-06	11	2.5	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A9	SRG	0.017	1	73.3	31.7	6.155E-06	11	2.5	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A9	SRG	0.016	1	76.1	28.9	6.155E-06	11	2.5	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A9	SRG	0.009	1	96.3	8.7	6.155E-06	11	2.5	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A38	SRG	0.018	2	73.3	31.7	5.9207E-06	11	1.9	0.0000055	4	0.63	0.8	307	455
SH-6S	A	A38	SRG	0.019	2	73.3	31.7	5.9207E-06	11	1.9	0.0000055	4	0.63	0.8	307	455
SH-6S	A	A38	SRG	0.015	2	73.3	31.7	5.9207E-06	11	1.9	0.0000055	4	0.63	0.8	307	455
SH-6S	A	A38	SRG	0.015	2	76.1	28.9	5.9207E-06	11	1.9	0.0000055	4	0.63	0.8	307	455
SH-6S	A	A38	SRG	0.010	2	96.3	8.7	5.9207E-06	11	1.9	0.0000055	4	0.63	0.8	307	455
SH-6S	A	A13	SRG	0.016	1	73.3	31.7	6.155E-06	11	3.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A13	SRG	0.015	1	73.3	31.7	6.155E-06	11	3.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A13	SRG	0.013	1	73.3	31.7	6.155E-06	11	3.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A13	SRG	0.014	1	76.1	28.9	6.155E-06	11	3.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A13	SRG	0.008	1	96.3	8.7	6.155E-06	11	3.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A45	SRG	0.011	8	73.3	31.7	4.525E-06	11	1.8	0.0000055	4	0.63	0.8	558	538
SH-6S	A	A45	SRG	0.014	8	73.3	31.7	4.525E-06	11	1.8	0.0000055	4	0.63	0.8	558	538
SH-6S	A	A45	SRG	0.013	8	73.3	31.7	4.525E-06	11	1.8	0.0000055	4	0.63	0.8	558	538
SH-6S	A	A45	SRG	0.011	8	76.1	28.9	4.525E-06	11	1.8	0.0000055	4	0.63	0.8	558	538
SH-6S	A	A45	SRG	0.007	8	96.3	8.7	4.525E-06	11	1.8	0.0000055	4	0.63	0.8	558	538
SH-6S	A	A3	SRG	0.013	1	75.1	29.88	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A3	SRG	0.016	1	75.1	29.88	6.155E-06	11	8.8	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.018	1	75.1	29.88	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.020	1	75.1	29.88	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A7	SRG	0.019	1	75.1	29.88	6.155E-06	11	8.6	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.016	1	75.1	29.88	6.155E-06	11	1.55	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.016	1	75.1	29.88	6.155E-06	11	1.55	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A26	SRG	0.023	1	75.1	29.88	6.155E-06	11	1.55	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A9	SRG	0.019	1	75.1	29.88	6.155E-06	11	2.5	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A38	SRG	0.013	2	75.1	29.88	5.9207E-06	11	1.9	0.0000055	4	0.63	0.8	307	455
SH-6S	A	A13	SRG	0.030	1	75.1	29.88	6.155E-06	11	3.3	0.0000055	4	0.63	0.8	182	388
SH-6S	A	A45	SRG	0.018	8	75.1	29.88	4.525E-06	11	1.8	0.0000055	4	0.63	0.8	558	538
SH-6S	A	AN1	SRG	0.008	28	75.1	29.88	0	11	1.2	0.0000055	4	0.63	0.8	600	540
SH-6S	A	AN1	SRG	0.007	28	75.1	29.88	0	11	1.2	0.0000055	4	0.63	0.8	600	540
SH-6S	A	AN1	SRG	0.003	28	75.1	29.88	0	11	1.2	0.0000055	4	0.63	0.8	600	540
SH-6S	B	B6	SRG	0.026	1	73.3	29.7	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.019	1	73.3	29.7	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.023	1	73.3	29.7	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.024	1	79.4	23.6	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.027	1	76.5	26.5	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.025	1	76.1	26.9	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.019	1	96.3	6.7	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.017	1	73.3	29.7	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.017	1	73.3	29.7	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388

SH-6S	B	B11	SRG	0.023	1	73.3	29.7	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.022	1	79.4	23.6	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.024	1	76.5	26.5	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.025	1	76.1	26.9	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.016	1	96.3	6.7	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B36	SRG	0.015	2	73.3	29.7	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.015	2	73.3	29.7	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.014	2	73.3	29.7	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.012	2	79.4	23.6	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.014	2	76.5	26.5	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.015	2	76.1	26.9	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.008	2	96.3	6.7	5.9207E-06	11	5.3	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B27	SRG	0.015	1	73.3	29.7	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.018	1	73.3	29.7	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.018	1	73.3	29.7	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.013	1	79.4	23.6	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.013	1	76.5	26.5	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.016	1	76.1	26.9	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.012	1	96.3	6.7	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.019	1	73.3	29.7	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.016	1	73.3	29.7	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.015	1	73.3	29.7	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.012	1	79.4	23.6	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.014	1	76.5	26.5	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.016	1	76.1	26.9	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.010	1	96.3	6.7	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B34	SRG	0.016	2	73.3	29.7	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B34	SRG	0.017	2	73.3	29.7	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B34	SRG	0.015	2	73.3	29.7	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B34	SRG	0.013	2	79.4	23.6	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B34	SRG	0.013	2	76.5	26.5	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B34	SRG	0.016	2	76.1	26.9	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B34	SRG	0.009	2	96.3	6.7	5.9207E-06	11	2.8	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B43	SRG	0.013	8	73.3	29.7	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B43	SRG	0.014	8	73.3	29.7	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B43	SRG	0.013	8	73.3	29.7	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B43	SRG	0.011	8	79.4	23.6	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B43	SRG	0.013	8	76.5	26.5	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B43	SRG	0.012	8	76.1	26.9	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B43	SRG	0.009	8	96.3	6.7	4.525E-06	11	5.6	0.0000055	4	0.53	0.8	558	538
SH-6S	B	B6	SRG	0.026	1	71.6	31.39	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B6	SRG	0.020	1	71.6	31.39	6.155E-06	11	1.5	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.023	1	71.6	31.39	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B11	SRG	0.030	1	71.6	31.39	6.155E-06	11	7.2	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B36	SRG	0.014	2	71.6	31.39	5.9207E-06	11	2.45	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B36	SRG	0.016	2	71.6	31.39	5.9207E-06	11	2.45	0.0000055	4	0.53	0.8	307	455
SH-6S	B	B27	SRG	0.025	1	71.6	31.39	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B27	SRG	0.019	1	71.6	31.39	6.155E-06	11	6.1	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.013	1	71.6	31.39	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.021	1	71.6	31.39	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B29	SRG	0.016	1	71.6	31.39	6.155E-06	11	7	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B34	SRG	0.017	1	71.6	31.39	6.155E-06	11	2.8	0.0000055	4	0.53	0.8	182	388
SH-6S	B	B34	SRG	0.015	1	71.6	31.39	6.155E-06	11	2.8	0.0000055	4	0.53	0.8	182	388
SH-6S	B	BN1	SRG	0.005	28	71.6	31.39	0	11	1.2	0.0000055	4	0.53	0.8	600	540
SH-6S	B	BN1	SRG	0.010	28	71.6	31.39	0	11	1.2	0.0000055	4	0.53	0.8	600	540
SH-6S	C	C5	SRG	0.016	1	73.3	29.7	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C5	SRG	0.018	1	73.3	29.7	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C5	SRG	0.019	1	73.3	29.7	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C5	SRG	0.018	1	76.1	26.9	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C5	SRG	0.009	1	96.3	6.7	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.010	1	73.3	29.7	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.022	1	73.3	29.7	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.020	1	73.3	29.7	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.014	1	76.1	26.9	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.012	1	96.3	6.7	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388

SH-6S	C	C9	SRG	0.031	1	73.3	29.7	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C9	SRG	0.019	1	73.3	29.7	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C9	SRG	0.020	1	73.3	29.7	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C9	SRG	0.021	1	76.1	26.9	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C9	SRG	0.016	1	96.3	6.7	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.016	1	73.3	29.7	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.020	1	73.3	29.7	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.023	1	73.3	29.7	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.017	1	76.1	26.9	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.012	1	96.3	6.7	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.023	1	73.3	29.7	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.030	1	73.3	29.7	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.027	1	73.3	29.7	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.021	1	76.1	26.9	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.013	1	96.3	6.7	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C26	SRG	0.019	1	73.3	29.7	6.155E-06	11	6.8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C26	SRG	0.022	1	73.3	29.7	6.155E-06	11	6.8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C26	SRG	0.022	1	73.3	29.7	6.155E-06	11	6.8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C26	SRG	0.019	1	76.1	26.9	6.155E-06	11	6.8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C26	SRG	0.013	1	96.3	6.7	6.155E-06	11	6.8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C28	SRG	0.035	2	73.3	29.7	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C28	SRG	0.022	2	73.3	29.7	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C28	SRG	0.022	2	73.3	29.7	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C28	SRG	0.019	2	76.1	26.9	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C28	SRG	0.014	2	96.3	6.7	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C19	SRG	0.013	1	73.3	29.7	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C19	SRG	0.020	1	73.3	29.7	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C19	SRG	0.021	1	73.3	29.7	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C19	SRG	0.013	1	76.1	26.9	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C19	SRG	0.011	1	96.3	6.7	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C5	SRG	0.021	1	72.8	30.17	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C5	SRG	0.022	1	72.8	30.17	6.155E-06	11	8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.015	1	72.8	30.17	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C24	SRG	0.027	1	72.8	30.17	6.155E-06	11	5.1	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C9	SRG	0.015	1	72.8	30.17	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C9	SRG	0.018	1	72.8	30.17	6.155E-06	11	5.9	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.022	1	72.8	30.17	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C10	SRG	0.019	1	72.8	30.17	6.155E-06	11	3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.020	1	72.8	30.17	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C11	SRG	0.019	1	72.8	30.17	6.155E-06	11	3.3	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C26	SRG	0.002	1	72.8	30.17	6.155E-06	11	6.8	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C28	SRG	0.022	2	72.8	30.17	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C28	SRG	0.022	2	72.8	30.17	5.9207E-06	11	10.4	0.0000055	4	0.42	0.8	307	455
SH-6S	C	C19	SRG	0.008	1	72.8	30.17	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	C	C19	SRG	0.012	1	72.8	30.17	6.155E-06	11	10	0.0000055	4	0.42	0.8	182	388
SH-6S	D	D2	SRG	0.015	1	73.3	27.7	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D2	SRG	0.019	1	73.3	27.7	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D2	SRG	0.014	1	73.3	27.7	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D2	SRG	0.012	1	76.1	24.9	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D2	SRG	0.010	1	96.3	4.7	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D6	SRG	0.030	1	73.3	27.7	6.155E-06	11	6.7	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D6	SRG	0.034	1	73.3	27.7	6.155E-06	11	6.7	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D6	SRG	0.023	1	73.3	27.7	6.155E-06	11	6.7	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D6	SRG	0.024	1	76.1	24.9	6.155E-06	11	6.7	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D6	SRG	0.013	1	96.3	4.7	6.155E-06	11	6.7	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.023	1	73.3	27.7	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.022	1	73.3	27.7	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.025	1	73.3	27.7	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.019	1	76.1	24.9	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.011	1	96.3	4.7	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.027	1	73.3	27.7	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.027	1	73.3	27.7	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.025	1	73.3	27.7	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.025	1	76.1	24.9	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.015	1	96.3	4.7	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388

SH-6S	D	D20	SRG	0.014	1	73.3	27.7	6.155E-06	11	10.9	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D20	SRG	0.021	1	73.3	27.7	6.155E-06	11	10.9	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D20	SRG	0.021	1	73.3	27.7	6.155E-06	11	10.9	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D20	SRG	0.017	1	76.1	24.9	6.155E-06	11	10.9	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D20	SRG	0.010	1	96.3	4.7	6.155E-06	11	10.9	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D10	SRG	0.019	1	73.3	27.7	6.155E-06	11	7.1	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D10	SRG	0.018	1	73.3	27.7	6.155E-06	11	7.1	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D10	SRG	0.016	1	73.3	27.7	6.155E-06	11	7.1	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D10	SRG	0.016	1	76.1	24.9	6.155E-06	11	7.1	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D10	SRG	0.011	1	96.3	4.7	6.155E-06	11	7.1	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D21	SRG	0.021	2	73.3	27.7	5.9207E-06	11	7.6	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D21	SRG	0.021	2	73.3	27.7	5.9207E-06	11	7.6	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D21	SRG	0.021	2	73.3	27.7	5.9207E-06	11	7.6	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D21	SRG	0.019	2	76.1	24.9	5.9207E-06	11	7.6	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D12	SRG	0.018	1	73.3	27.7	6.155E-06	11	5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D12	SRG	0.018	1	73.3	27.7	6.155E-06	11	5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D12	SRG	0.019	1	73.3	27.7	6.155E-06	11	5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D12	SRG	0.016	1	76.1	24.9	6.155E-06	11	5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D2	SRG	0.022	1	73.4	27.56	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D2	SRG	0.002	1	73.4	27.56	6.155E-06	11	4.5	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.014	1	73.4	27.56	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D7	SRG	0.013	1	73.4	27.56	6.155E-06	11	2.2	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.021	1	73.4	27.56	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D19	SRG	0.023	1	73.4	27.56	6.155E-06	11	7.4	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D20	SRG	0.014	2	73.4	27.56	5.9207E-06	11	10.9	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D20	SRG	0.020	2	73.4	27.56	5.9207E-06	11	10.9	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D21	SRG	0.010	2	73.4	27.56	5.9207E-06	11	7.6	0.0000055	4	0.53	0.9	307	455
SH-6S	D	D12	SRG	0.017	1	73.4	27.56	6.155E-06	11	5.9	0.0000055	4	0.53	0.9	182	388
SH-6S	D	D12	SRG	0.020	1	73.4	27.56	6.155E-06	11	5.9	0.0000055	4	0.53	0.9	182	388
SH-6S	E	E12	LS	0.009	2	73.3	39.7	3.2647E-06	11	14.7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E12	LS	0.008	2	73.3	39.7	3.2647E-06	11	14.7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E12	LS	0.008	2	73.3	39.7	3.2647E-06	11	14.7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E12	LS	0.010	2	76.1	36.9	3.2647E-06	11	14.7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E12	LS	0.067	2	96.3	16.7	3.2647E-06	11	14.7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E15	LS	0.011	2	73.3	39.7	3.2647E-06	11	11.8	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E15	LS	0.008	2	73.3	39.7	3.2647E-06	11	11.8	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E15	LS	0.008	2	73.3	39.7	3.2647E-06	11	11.8	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E15	LS	0.008	2	76.1	36.9	3.2647E-06	11	11.8	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E15	LS	0.006	2	96.3	16.7	3.2647E-06	11	11.8	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E5	LS	0.014	1	73.3	39.7	3.3929E-06	11	8.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E5	LS	0.016	1	73.3	39.7	3.3929E-06	11	8.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E5	LS	0.018	1	73.3	39.7	3.3929E-06	11	8.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E5	LS	0.013	1	76.1	36.9	3.3929E-06	11	8.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E5	LS	0.010	1	96.3	16.7	3.3929E-06	11	8.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E6	LS	0.010	1	73.3	39.7	3.3929E-06	11	8.8	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E6	LS	0.013	1	73.3	39.7	3.3929E-06	11	8.8	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E6	LS	0.013	1	73.3	39.7	3.3929E-06	11	8.8	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E6	LS	0.010	1	76.1	36.9	3.3929E-06	11	8.8	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E6	LS	0.008	1	96.3	16.7	3.3929E-06	11	8.8	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E19	LS	0.014	2	73.3	39.7	3.2647E-06	11	2.9	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E19	LS	0.014	2	73.3	39.7	3.2647E-06	11	2.9	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E19	LS	0.010	2	73.3	39.7	3.2647E-06	11	2.9	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E19	LS	0.015	2	76.1	36.9	3.2647E-06	11	2.9	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E19	LS	0.011	2	96.3	16.7	3.2647E-06	11	2.9	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E27	LS	0.010	9	73.3	39.7	2.375E-06	11	2.9	0.0000031	4	0.63	0.9	448	550
SH-6S	E	E27	LS	0.010	9	73.3	39.7	2.375E-06	11	2.9	0.0000031	4	0.63	0.9	448	550
SH-6S	E	E27	LS	0.009	9	73.3	39.7	2.375E-06	11	2.9	0.0000031	4	0.63	0.9	448	550
SH-6S	E	E27	LS	0.012	9	76.1	36.9	2.375E-06	11	2.9	0.0000031	4	0.63	0.9	448	550
SH-6S	E	E27	LS	0.005	9	96.3	16.7	2.375E-06	11	2.9	0.0000031	4	0.63	0.9	448	550
SH-6S	E	E20	LS	0.012	2	73.3	39.7	3.2647E-06	11	7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E20	LS	0.020	2	73.3	39.7	3.2647E-06	11	7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E20	LS	0.018	2	73.3	39.7	3.2647E-06	11	7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E20	LS	0.015	2	76.1	36.9	3.2647E-06	11	7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E20	LS	0.006	2	96.3	16.7	3.2647E-06	11	7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E10	LS	0.019	1	73.3	39.7	3.3929E-06	11	6.1	0.0000031	4	0.63	0.9	204	391

SH-6S	E	E10	LS	0.018	1	73.3	39.7	3.3929E-06	11	6.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E10	LS	0.014	1	73.3	39.7	3.3929E-06	11	6.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E10	LS	0.017	1	76.1	36.9	3.3929E-06	11	6.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E10	LS	0.010	1	96.3	16.7	3.3929E-06	11	6.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E12	LS	0.010	2	64.5	48.54	3.2647E-06	11	6.7	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E15	LS	0.013	2	64.5	48.54	3.2647E-06	11	5.9	0.0000031	4	0.63	0.9	294	460
SH-6S	E	E5	LS	0.016	1	64.5	48.54	3.3929E-06	11	5.1	0.0000031	4	0.63	0.9	204	391
SH-6S	E	E6	LS	0.012	1	64.5	48.54	3.3929E-06	11	6.35	0.0000031	4	0.63	0.9	204	391
SH-6S	F	F2	LS	0.028	1	73.3	33.7	3.3929E-06	11	15.3	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F2	LS	0.025	1	73.3	33.7	3.3929E-06	11	15.3	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F2	LS	0.025	1	73.3	33.7	3.3929E-06	11	15.3	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F2	LS	0.024	1	76.1	30.9	3.3929E-06	11	15.3	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F2	LS	0.013	1	96.3	10.7	3.3929E-06	11	15.3	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F10	LS	0.017	2	73.3	33.7	3.2647E-06	11	9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F10	LS	0.018	2	73.3	33.7	3.2647E-06	11	9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F10	LS	0.019	2	73.3	33.7	3.2647E-06	11	9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F10	LS	0.018	2	76.1	30.9	3.2647E-06	11	9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F10	LS	0.009	2	96.3	10.7	3.2647E-06	11	9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F11	LS	0.021	2	73.3	33.7	3.2647E-06	11	10.9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F11	LS	0.022	2	73.3	33.7	3.2647E-06	11	10.9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F11	LS	0.018	2	73.3	33.7	3.2647E-06	11	10.9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F11	LS	0.019	2	76.1	30.9	3.2647E-06	11	10.9	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F3	LS	0.016	1	73.3	33.7	3.3929E-06	11	14.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F3	LS	0.013	1	73.3	33.7	3.3929E-06	11	14.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F3	LS	0.011	1	73.3	33.7	3.3929E-06	11	14.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F3	LS	0.012	1	76.1	30.9	3.3929E-06	11	14.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F3	LS	0.008	1	96.3	10.7	3.3929E-06	11	14.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F14	LS	0.011	2	73.3	33.7	3.2647E-06	11	8.2	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F14	LS	0.011	2	73.3	33.7	3.2647E-06	11	8.2	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F14	LS	0.014	2	73.3	33.7	3.2647E-06	11	8.2	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F14	LS	0.012	2	76.1	30.9	3.2647E-06	11	8.2	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F5	LS	0.016	1	73.3	33.7	3.3929E-06	11	9.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F5	LS	0.017	1	73.3	33.7	3.3929E-06	11	9.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F5	LS	0.020	1	73.3	33.7	3.3929E-06	11	9.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F5	LS	0.019	1	76.1	30.9	3.3929E-06	11	9.2	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F16	LS	0.020	2	73.3	33.7	3.2647E-06	11	11.1	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F16	LS	0.020	2	73.3	33.7	3.2647E-06	11	11.1	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F16	LS	0.020	2	73.3	33.7	3.2647E-06	11	11.1	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F16	LS	0.022	2	76.1	30.9	3.2647E-06	11	11.1	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F16	LS	0.010	2	96.3	10.7	3.2647E-06	11	11.1	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F8	LS	0.022	1	73.3	33.7	3.3929E-06	11	6.4	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F8	LS	0.020	1	73.3	33.7	3.3929E-06	11	6.4	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F8	LS	0.022	1	73.3	33.7	3.3929E-06	11	6.4	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F8	LS	0.027	1	76.1	30.9	3.3929E-06	11	6.4	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F8	LS	0.010	1	96.3	10.7	3.3929E-06	11	6.4	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F2	LS	0.016	1	70.7	36.3	3.3929E-06	11	1.4	0.0000031	4	0.52	0.8	204	391
SH-6S	F	F14	LS	0.016	2	70.7	36.3	3.2647E-06	11	4.1	0.0000031	4	0.52	0.8	294	460
SH-6S	F	F8	LS	0.016	1	70.7	36.3	3.3929E-06	11	6.2	0.0000031	4	0.52	0.8	204	391

PRO	S	ID	AGG	CW	Day	Z	D	L	SOIL	%	Ø	Ft	E
SH-6W	A	A2	SRG	0.008	2	311.3	11	10.1	4	0.63	0.75	283	443
SH-6W	A	A2	SRG	0.011	2	311.3	11	10.1	4	0.63	0.75	283	443
SH-6W	A	A2	SRG	0.007	2	311.3	11	10.1	4	0.63	0.75	283	443
SH-6W	A	A2	SRG	0.007	2	311.3	11	10.1	4	0.63	0.75	283	443
SH-6W	A	A2	SRG	0.013	2	311.3	11	10.1	4	0.63	0.75	283	443
SH-6W	A	A4	SRG	0.008	2	311.3	11	11.1	4	0.63	0.75	283	443
SH-6W	A	A4	SRG	0.012	2	311.3	11	11.1	4	0.63	0.75	283	443
SH-6W	A	A4	SRG	0.007	2	311.3	11	11.1	4	0.63	0.75	283	443
SH-6W	A	A4	SRG	0.009	2	311.3	11	11.1	4	0.63	0.75	283	443
SH-6W	A	A4	SRG	0.011	2	311.3	11	11.1	4	0.63	0.75	283	443
SH-6W	A	A5	SRG	0.01	2	311.3	11	9.35	4	0.63	0.75	283	443
SH-6W	A	A5	SRG	0.01	2	311.3	11	9.35	4	0.63	0.75	283	443
SH-6W	A	A5	SRG	0.008	2	311.3	11	9.35	4	0.63	0.75	283	443
SH-6W	A	A5	SRG	0.008	2	311.3	11	9.35	4	0.63	0.75	283	443
SH-6W	A	A5	SRG	0.014	2	311.3	11	9.35	4	0.63	0.75	283	443
SH-6W	A	A10	SRG	0.007	3	299	11	6.1	4	0.63	0.75	361.6	500
SH-6W	A	A10	SRG	0.011	3	299	11	6.1	4	0.63	0.75	361.6	500
SH-6W	A	A10	SRG	0.005	3	299	11	6.1	4	0.63	0.75	361.6	500
SH-6W	A	A10	SRG	0.005	3	299	11	6.1	4	0.63	0.75	361.6	500
SH-6W	A	A10	SRG	0.01	3	299	11	6.1	4	0.63	0.75	361.6	500
SH-6W	A	A13	SRG	0.009	3	299	11	9.15	4	0.63	0.75	361.6	500
SH-6W	A	A13	SRG	0.008	3	299	11	9.15	4	0.63	0.75	361.6	500
SH-6W	A	A13	SRG	0.008	3	299	11	9.15	4	0.63	0.75	361.6	500
SH-6W	A	A13	SRG	0.006	3	299	11	9.15	4	0.63	0.75	361.6	500
SH-6W	A	A13	SRG	0.011	3	299	11	9.15	4	0.63	0.75	361.6	500
SH-6W	A	A14	SRG	0.01	3	299	11	12.3	4	0.63	0.75	361.6	500
SH-6W	A	A14	SRG	0.012	3	299	11	12.3	4	0.63	0.75	361.6	500
SH-6W	A	A14	SRG	0.012	3	299	11	12.3	4	0.63	0.75	361.6	500
SH-6W	A	A14	SRG	0.009	3	299	11	12.3	4	0.63	0.75	361.6	500
SH-6W	A	A14	SRG	0.016	3	299	11	12.3	4	0.63	0.75	361.6	500
SH-6W	A	A2	SRG	0.025	2	311.3	11	10.1	4	0.63	0.75	283	443
SH-6W	A	A4	SRG	0.02	2	311.3	11	9	4	0.63	0.75	283	443
SH-6W	A	A5	SRG	0.02	2	311.3	11	9.35	4	0.63	0.75	283	443
SH-6W	A	A10	SRG	0.012	3	299	11	6.1	4	0.63	0.75	361.6	500
SH-6W	A	A13	SRG	0.017	3	299	11	9.15	4	0.63	0.75	361.6	500
SH-6W	A	AN1	SRG	0.01	360	0	11	6.75	4	0.63	0.75	553.8	549
SH-6W	A	A14	SRG	0.032	3	299	11	11.6	4	0.63	0.75	361.6	500
SH-6W	A	AN2	SRG	0.005	360	0	11	7.25	4	0.63	0.75	553.8	549
SH-6W	B	B1	SRG	0.008	2	311.3	11	6.9	4	0.53	0.75	283	443
SH-6W	B	B1	SRG	0.009	2	311.3	11	6.9	4	0.53	0.75	283	443
SH-6W	B	B1	SRG	0.011	2	311.3	11	6.9	4	0.53	0.75	283	443
SH-6W	B	B1	SRG	0.009	2	311.3	11	6.9	4	0.53	0.75	283	443
SH-6W	B	B1	SRG	0.013	2	311.3	11	6.9	4	0.53	0.75	283	443
SH-6W	B	B15	SRG	0.007	3	299	11	5	4	0.53	0.75	361.6	500
SH-6W	B	B15	SRG	0.009	3	299	11	5	4	0.53	0.75	361.6	500
SH-6W	B	B15	SRG	0.008	3	299	11	5	4	0.53	0.75	361.6	500
SH-6W	B	B15	SRG	0.008	3	299	11	5	4	0.53	0.75	361.6	500
SH-6W	B	B15	SRG	0.011	3	299	11	5	4	0.53	0.75	361.6	500
SH-6W	B	B16	SRG	0.006	3	299	11	5.9	4	0.53	0.75	361.6	500
SH-6W	B	B16	SRG	0.009	3	299	11	5.9	4	0.53	0.75	361.6	500
SH-6W	B	B16	SRG	0.008	3	299	11	5.9	4	0.53	0.75	361.6	500
SH-6W	B	B16	SRG	0.008	3	299	11	5.9	4	0.53	0.75	361.6	500
SH-6W	B	B16	SRG	0.011	3	299	11	5.9	4	0.53	0.75	361.6	500
SH-6W	B	B17	SRG	0.007	3	299	11	8.6	4	0.53	0.75	361.6	500
SH-6W	B	B17	SRG	0.008	3	299	11	8.6	4	0.53	0.75	361.6	500
SH-6W	B	B17	SRG	0.005	3	299	11	8.6	4	0.53	0.75	361.6	500

SH-6W	B	B17	SRG	0.005	3	299	11	8.6	4	0.53	0.75	361.6	500
SH-6W	B	B17	SRG	0.01	3	299	11	8.6	4	0.53	0.75	361.6	500
SH-6W	B	B7	SRG	0.004	2	311.3	11	10	4	0.53	0.75	283	443
SH-6W	B	B7	SRG	0.004	2	311.3	11	10	4	0.53	0.75	283	443
SH-6W	B	B7	SRG	0.004	2	311.3	11	10	4	0.53	0.75	283	443
SH-6W	B	B7	SRG	0.003	2	311.3	11	10	4	0.53	0.75	283	443
SH-6W	B	B7	SRG	0.005	2	311.3	11	10	4	0.53	0.75	283	443
SH-6W	B	B8	SRG	0.009	2	311.3	11	6.1	4	0.53	0.75	283	443
SH-6W	B	B8	SRG	0.008	2	311.3	11	6.1	4	0.53	0.75	283	443
SH-6W	B	B8	SRG	0.007	2	311.3	11	6.1	4	0.53	0.75	283	443
SH-6W	B	B8	SRG	0.007	2	311.3	11	6.1	4	0.53	0.75	283	443
SH-6W	B	B8	SRG	0.01	2	311.3	11	6.1	4	0.53	0.75	283	443
SH-6W	B	B1	SRG	0.02	2	311.3	11	6.9	4	0.53	0.75	283	443
SH-6W	B	B15	SRG	0.012	3	299	11	5	4	0.53	0.75	361.6	500
SH-6W	B	B16	SRG	0.015	3	299	11	5.9	4	0.53	0.75	361.6	500
SH-6W	B	B17	SRG	0.02	3	299	11	8.6	4	0.53	0.75	361.6	500
SH-6W	B	BN1	SRG	0.006	360	0	11	5.4	4	0.53	0.75	553.8	549
SH-6W	B	B7	SRG	0.024	2	311.3	11	10	4	0.53	0.75	283	443
SH-6W	B	B8	SRG	0.017	2	311.3	11	6.1	4	0.53	0.75	283	443
SH-6W	B	BN2	SRG	0.006	360	0	11	2.5	4	0.53	0.75	553.8	549
SH-6W	B	BN3	SRG	0.01	360	0	11	5	4	0.53	0.75	553.8	549
SH-6W	C	C4	SRG	0.011	2	311.3	11	14.2	4	0.42	0.75	283	443
SH-6W	C	C4	SRG	0.013	2	311.3	11	14.2	4	0.42	0.75	283	443
SH-6W	C	C4	SRG	0.01	2	311.3	11	14.2	4	0.42	0.75	283	443
SH-6W	C	C4	SRG	0.01	2	311.3	11	14.2	4	0.42	0.75	283	443
SH-6W	C	C4	SRG	0.014	2	311.3	11	14.2	4	0.42	0.75	283	443
SH-6W	C	C7	SRG	0.01	2	311.3	11	15.6	4	0.42	0.75	283	443
SH-6W	C	C7	SRG	0.01	2	311.3	11	15.6	4	0.42	0.75	283	443
SH-6W	C	C7	SRG	0.01	2	311.3	11	15.6	4	0.42	0.75	283	443
SH-6W	C	C7	SRG	0.007	2	311.3	11	15.6	4	0.42	0.75	283	443
SH-6W	C	C7	SRG	0.014	2	311.3	11	15.6	4	0.42	0.75	283	443
SH-6W	C	C8	SRG	0.009	2	311.3	11	12.6	4	0.42	0.75	283	443
SH-6W	C	C8	SRG	0.01	2	311.3	11	12.6	4	0.42	0.75	283	443
SH-6W	C	C8	SRG	0.008	2	311.3	11	12.6	4	0.42	0.75	283	443
SH-6W	C	C8	SRG	0.007	2	311.3	11	12.6	4	0.42	0.75	283	443
SH-6W	C	C8	SRG	0.011	2	311.3	11	12.6	4	0.42	0.75	283	443
SH-6W	C	C10	SRG	0.011	2	311.3	11	15.8	4	0.42	0.75	283	443
SH-6W	C	C10	SRG	0.011	2	311.3	11	15.8	4	0.42	0.75	283	443
SH-6W	C	C10	SRG	0.009	2	311.3	11	15.8	4	0.42	0.75	283	443
SH-6W	C	C10	SRG	0.01	2	311.3	11	15.8	4	0.42	0.75	283	443
SH-6W	C	C10	SRG	0.015	2	311.3	11	15.8	4	0.42	0.75	283	443
SH-6W	C	C11	SRG	0.016	2	311.3	11	12	4	0.42	0.75	283	443
SH-6W	C	C11	SRG	0.017	2	311.3	11	12	4	0.42	0.75	283	443
SH-6W	C	C11	SRG	0.015	2	311.3	11	12	4	0.42	0.75	283	443
SH-6W	C	C11	SRG	0.013	2	311.3	11	12	4	0.42	0.75	283	443
SH-6W	C	C11	SRG	0.02	2	311.3	11	12	4	0.42	0.75	283	443
SH-6W	C	C12	SRG	0.012	2	311.3	11	.	4	0.42	0.75	283	443
SH-6W	C	C12	SRG	0.013	2	311.3	11	.	4	0.42	0.75	283	443
SH-6W	C	C12	SRG	0.01	2	311.3	11	.	4	0.42	0.75	283	443
SH-6W	C	C12	SRG	0.01	2	311.3	11	.	4	0.42	0.75	283	443
SH-6W	C	C12	SRG	0.015	2	311.3	11	.	4	0.42	0.75	283	443
SH-6W	C	CN1	SRG	0.007	360	311.3	11	4.1	4	0.42	0.75	553.8	549
SH-6W	C	C4	SRG	0.03	2	311.3	11	14.2	4	0.42	0.75	283	443
SH-6W	C	CN2	SRG	0.006	360	311.3	11	8.5	4	0.42	0.75	283	443
SH-6W	C	C7	SRG	0.04	2	311.3	11	15.6	4	0.42	0.75	283	443
SH-6W	C	C8	SRG	0.025	2	311.3	11	5.7	4	0.42	0.75	283	443
SH-6W	C	C10	SRG	0.034	2	311.3	11	9.9	4	0.42	0.75	283	443

SH-6W	C	CN3	SRG	0.01	360	311.3	11	8.7	4	0.42	0.75	553.8	549
SH-6W	C	C11	SRG	0.04	2	311.3	11	12	4	0.42	0.75	283	443
SH-6W	C	C12	SRG	0.028	2	311.3	11	.	4	0.42	0.75	283	443
SH-6W	D	D9	SRG	0.009	5	274.4	11	.	4	0.53	0.88	454.4	533
SH-6W	D	D9	SRG	0.01	5	274.4	11	.	4	0.53	0.88	454.4	533
SH-6W	D	D9	SRG	0.007	5	274.4	11	.	4	0.53	0.88	454.4	533
SH-6W	D	D9	SRG	0.005	5	274.4	11	.	4	0.53	0.88	454.4	533
SH-6W	D	D9	SRG	0.01	5	274.4	11	.	4	0.53	0.88	454.4	533
SH-6W	D	D1	SRG	0.009	2	311.3	11	8	4	0.53	0.88	283	443
SH-6W	D	D1	SRG	0.009	2	311.3	11	8	4	0.53	0.88	283	443
SH-6W	D	D1	SRG	0.01	2	311.3	11	8	4	0.53	0.88	283	443
SH-6W	D	D1	SRG	0.009	2	311.3	11	8	4	0.53	0.88	283	443
SH-6W	D	D1	SRG	0.014	2	311.3	11	8	4	0.53	0.88	283	443
SH-6W	D	D4	SRG	0.011	2	311.3	11	8.4	4	0.53	0.88	283	443
SH-6W	D	D4	SRG	0.011	2	311.3	11	8.4	4	0.53	0.88	283	443
SH-6W	D	D4	SRG	0.01	2	311.3	11	8.4	4	0.53	0.88	283	443
SH-6W	D	D4	SRG	0.009	2	311.3	11	8.4	4	0.53	0.88	283	443
SH-6W	D	D4	SRG	0.013	2	311.3	11	8.4	4	0.53	0.88	283	443
SH-6W	D	D12	SRG	0.009	5	274.4	11	9.2	4	0.53	0.88	454.4	533
SH-6W	D	D12	SRG	0.01	5	274.4	11	9.2	4	0.53	0.88	454.4	533
SH-6W	D	D12	SRG	0.008	5	274.4	11	9.2	4	0.53	0.88	454.4	533
SH-6W	D	D12	SRG	0.008	5	274.4	11	9.2	4	0.53	0.88	454.4	533
SH-6W	D	D12	SRG	0.012	5	274.4	11	9.2	4	0.53	0.88	454.4	533
SH-6W	D	D7	SRG	0.005	2	311.3	11	7	4	0.53	0.88	283	443
SH-6W	D	D7	SRG	0.005	2	311.3	11	7	4	0.53	0.88	283	443
SH-6W	D	D7	SRG	0.005	2	311.3	11	7	4	0.53	0.88	283	443
SH-6W	D	D7	SRG	0.004	2	311.3	11	7	4	0.53	0.88	283	443
SH-6W	D	D7	SRG	0.006	2	311.3	11	7	4	0.53	0.88	283	443
SH-6W	D	D13	SRG	0.006	5	274.4	11	5.8	4	0.53	0.88	454.4	533
SH-6W	D	D13	SRG	0.005	5	274.4	11	5.8	4	0.53	0.88	454.4	533
SH-6W	D	D13	SRG	0.005	5	274.4	11	5.8	4	0.53	0.88	454.4	533
SH-6W	D	D13	SRG	0.003	5	274.4	11	5.8	4	0.53	0.88	454.4	533
SH-6W	D	D13	SRG	0.005	5	274.4	11	5.8	4	0.53	0.88	454.4	533
SH-6W	D	D9	SRG	0.017	5	274.4	11	.	4	0.53	0.88	454.4	533
SH-6W	D	D1	SRG	0.015	2	311.3	11	8	4	0.53	0.88	283	443
SH-6W	D	DN1	SRG	0.003	360	0	11	6.9	4	0.53	0.88	554	549
SH-6W	D	DN2	SRG	0.007	360	0	11	6.4	4	0.53	0.88	554	549
SH-6W	D	D4	SRG	0.02	2	311.3	11	8.4	4	0.53	0.88	283	443
SH-6W	D	D12	SRG	0.017	5	274.4	11	5	4	0.53	0.88	454.4	533
SH-6W	D	DN3	SRG	0.007	360	0	11	3.8	4	0.53	0.88	554	549
SH-6W	D	D7	SRG	0.014	2	311.3	11	7	4	0.53	0.88	283	443
SH-6W	D	D13	SRG	0.01	5	274.4	11	5.8	4	0.53	0.88	454.4	533
SH-6W	E	E8	LS	0.004	11	212.2	11	14.5	4	0.63	0.88	518.4	537
SH-6W	E	E8	LS	0.004	11	212.2	11	14.5	4	0.63	0.88	518.4	537
SH-6W	E	E8	LS	0.002	11	212.2	11	14.5	4	0.63	0.88	518.4	537
SH-6W	E	E8	LS	0.002	11	212.2	11	14.5	4	0.63	0.88	518.4	537
SH-6W	E	E8	LS	0.002	11	212.2	11	14.5	4	0.63	0.88	518.4	537
SH-6W	E	E6	LS	0.004	11	212.2	11	16.3	4	0.63	0.88	518.4	537
SH-6W	E	E6	LS	0.004	11	212.2	11	16.3	4	0.63	0.88	518.4	537
SH-6W	E	E6	LS	0.003	11	212.2	11	16.3	4	0.63	0.88	518.4	537
SH-6W	E	E6	LS	0.003	11	212.2	11	16.3	4	0.63	0.88	518.4	537
SH-6W	E	E6	LS	0.006	11	212.2	11	16.3	4	0.63	0.88	518.4	537
SH-6W	E	E4	LS	0.003	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E4	LS	0.002	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E4	LS	0.002	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E4	LS	0.002	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E4	LS	0.004	11	212.2	11	14.1	4	0.63	0.88	518.4	537

SH-6W	E	E3	LS	0.002	11	212.2	11	13	4	0.63	0.88	518.4	537
SH-6W	E	E3	LS	0.002	11	212.2	11	13	4	0.63	0.88	518.4	537
SH-6W	E	E3	LS	0.001	11	212.2	11	13	4	0.63	0.88	518.4	537
SH-6W	E	E3	LS	0.001	11	212.2	11	13	4	0.63	0.88	518.4	537
SH-6W	E	E3	LS	0.003	11	212.2	11	13	4	0.63	0.88	518.4	537
SH-6W	E	E2	LS	0.003	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E2	LS	0.003	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E2	LS	0.004	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E2	LS	0.003	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E2	LS	0.002	11	212.2	11	14.1	4	0.63	0.88	518.4	537
SH-6W	E	E1	LS	0.003	11	212.2	11	15.3	4	0.63	0.88	518.4	537
SH-6W	E	E1	LS	0.004	11	212.2	11	15.3	4	0.63	0.88	518.4	537
SH-6W	E	E1	LS	0.002	11	212.2	11	15.3	4	0.63	0.88	518.4	537
SH-6W	E	E1	LS	0.002	11	212.2	11	15.3	4	0.63	0.88	518.4	537
SH-6W	E	E1	LS	0.002	11	212.2	11	15.3	4	0.63	0.88	518.4	537
SH-6W	E	E8	LS	0.01	11	212.2	11	14.5	4	0.63	0.88	518.4	537
SH-6W	E	E6	LS	0.016	11	212.2	11	13.4	4	0.63	0.88	518.4	537
SH-6W	E	EN1	LS	0.002	360	0	11	8.8	4	0.63	0.88	556	539
SH-6W	E	E4	LS	0.01	11	212.2	11	9.3	4	0.63	0.88	518.4	537
SH-6W	E	E3	LS	0.013	11	212.2	11	8.1	4	0.63	0.88	518.4	537
SH-6W	E	E2	LS	0.009	11	212.2	11	8.7	4	0.63	0.88	518.4	537
SH-6W	E	EN2	LS	0.004	360	0	11	6.4	4	0.63	0.88	556	539
SH-6W	E	EN3	LS	0.003	360	0	11	5.3	4	0.63	0.88	556	539
SH-6W	E	E1	LS	0.011	11	212.2	11	9.4	4	0.63	0.88	518.4	537
SH-6W	F	F8	LS	0.003	10	224.8	11	.	4	0.52	0.75	510.7	536
SH-6W	F	F8	LS	0.003	10	224.8	11	.	4	0.52	0.75	510.7	536
SH-6W	F	F8	LS	0.003	10	224.8	11	.	4	0.52	0.75	510.7	536
SH-6W	F	F8	LS	0.003	10	224.8	11	.	4	0.52	0.75	510.7	536
SH-6W	F	F8	LS	0.004	10	224.8	11	.	4	0.52	0.75	510.7	536
SH-6W	F	F7	LS	0.003	10	224.8	11	15	4	0.52	0.75	510.7	536
SH-6W	F	F7	LS	0.003	10	224.8	11	15	4	0.52	0.75	510.7	536
SH-6W	F	F7	LS	0.002	10	224.8	11	15	4	0.52	0.75	510.7	536
SH-6W	F	F7	LS	0.003	10	224.8	11	15	4	0.52	0.75	510.7	536
SH-6W	F	F7	LS	0.003	10	224.8	11	15	4	0.52	0.75	510.7	536
SH-6W	F	F6	LS	0.003	10	224.8	11	14.7	4	0.52	0.75	510.7	536
SH-6W	F	F6	LS	0.002	10	224.8	11	14.7	4	0.52	0.75	510.7	536
SH-6W	F	F6	LS	0.002	10	224.8	11	14.7	4	0.52	0.75	510.7	536
SH-6W	F	F6	LS	0.002	10	224.8	11	14.7	4	0.52	0.75	510.7	536
SH-6W	F	F6	LS	0.002	10	224.8	11	14.7	4	0.52	0.75	510.7	536
SH-6W	F	F5	LS	0.003	10	224.8	11	21.4	4	0.52	0.75	510.7	536
SH-6W	F	F5	LS	0.003	10	224.8	11	21.4	4	0.52	0.75	510.7	536
SH-6W	F	F5	LS	0.002	10	224.8	11	21.4	4	0.52	0.75	510.7	536
SH-6W	F	F5	LS	0.002	10	224.8	11	21.4	4	0.52	0.75	510.7	536
SH-6W	F	F5	LS	0.003	10	224.8	11	21.4	4	0.52	0.75	510.7	536
SH-6W	F	F4	LS	0.003	10	224.8	11	23.4	4	0.52	0.75	510.7	536
SH-6W	F	F4	LS	0.003	10	224.8	11	23.4	4	0.52	0.75	510.7	536
SH-6W	F	F4	LS	0.003	10	224.8	11	23.4	4	0.52	0.75	510.7	536
SH-6W	F	F4	LS	0.003	10	224.8	11	23.4	4	0.52	0.75	510.7	536
SH-6W	F	F4	LS	0.002	10	224.8	11	23.4	4	0.52	0.75	510.7	536
SH-6W	F	F3	LS	0.003	10	224.8	11	25.5	4	0.52	0.75	510.7	536
SH-6W	F	F3	LS	0.002	10	224.8	11	25.5	4	0.52	0.75	510.7	536
SH-6W	F	F3	LS	0.002	10	224.8	11	25.5	4	0.52	0.75	510.7	536
SH-6W	F	F3	LS	0.002	10	224.8	11	25.5	4	0.52	0.75	510.7	536
SH-6W	F	F3	LS	0.003	10	224.8	11	25.5	4	0.52	0.75	510.7	536
SH-6W	F	F8	LS	0.012	10	224.8	11	.	4	0.52	0.75	510.7	536
SH-6W	F	F7	LS	0.016	10	224.8	11	9.6	4	0.52	0.75	510.7	536
SH-6W	F	F6	LS	0.01	10	224.8	11	11	4	0.52	0.75	510.7	536

SH-6W	F	F5	LS	0.015	10	224.8	11	10	4	0.52	0.75	510.7	536
SH-6W	F	F4	LS	0.011	10	224.8	11	13.4	4	0.52	0.75	510.7	536
SH-6W	F	FN1	LS	0.002	10	0	11	5.7	4	0.52	0.75	556	539
SH-6W	F	FN2	LS	0.008	10	0	11	10.8	4	0.52	0.75	556	539
SH-6W	F	F3	LS	0.012	10	224.8	11	14.7	4	0.52	0.75	510.7	536
SH-6W	F	FN3	LS	0.002	10	0	11	5.6	4	0.52	0.75	556	539
SH-6W	G	G9	LS	0.002	10	224.8	11	8.7	4	0.61	0.75	510.7	536
SH-6W	G	G9	LS	0.002	10	224.8	11	8.7	4	0.61	0.75	510.7	536
SH-6W	G	G9	LS	0.002	10	224.8	11	8.7	4	0.61	0.75	510.7	536
SH-6W	G	G9	LS	0.001	10	224.8	11	8.7	4	0.61	0.75	510.7	536
SH-6W	G	G9	LS	0.001	10	224.8	11	8.7	4	0.61	0.75	510.7	536
SH-6W	G	G8	LS	0.003	10	224.8	11	13.2	4	0.61	0.75	510.7	536
SH-6W	G	G8	LS	0.003	10	224.8	11	13.2	4	0.61	0.75	510.7	536
SH-6W	G	G8	LS	0.002	10	224.8	11	13.2	4	0.61	0.75	510.7	536
SH-6W	G	G8	LS	0.002	10	224.8	11	13.2	4	0.61	0.75	510.7	536
SH-6W	G	G8	LS	0.003	10	224.8	11	13.2	4	0.61	0.75	510.7	536
SH-6W	G	G7	LS	0.003	10	224.8	11	9.6	4	0.61	0.75	510.7	536
SH-6W	G	G7	LS	0.003	10	224.8	11	9.6	4	0.61	0.75	510.7	536
SH-6W	G	G7	LS	0.002	10	224.8	11	9.6	4	0.61	0.75	510.7	536
SH-6W	G	G7	LS	0.001	10	224.8	11	9.6	4	0.61	0.75	510.7	536
SH-6W	G	G7	LS	0.002	10	224.8	11	9.6	4	0.61	0.75	510.7	536
SH-6W	G	G6	LS	0.004	10	224.8	11	10.6	4	0.61	0.75	510.7	536
SH-6W	G	G6	LS	0.003	10	224.8	11	10.6	4	0.61	0.75	510.7	536
SH-6W	G	G6	LS	0.002	10	224.8	11	10.6	4	0.61	0.75	510.7	536
SH-6W	G	G6	LS	0.002	10	224.8	11	10.6	4	0.61	0.75	510.7	536
SH-6W	G	G6	LS	0.004	10	224.8	11	10.6	4	0.61	0.75	510.7	536
SH-6W	G	G3	LS	0.003	10	224.8	11	12.1	4	0.61	0.75	510.7	536
SH-6W	G	G3	LS	0.003	10	224.8	11	12.1	4	0.61	0.75	510.7	536
SH-6W	G	G3	LS	0.003	10	224.8	11	12.1	4	0.61	0.75	510.7	536
SH-6W	G	G3	LS	0.003	10	224.8	11	12.1	4	0.61	0.75	510.7	536
SH-6W	G	G3	LS	0.002	10	224.8	11	12.1	4	0.61	0.75	510.7	536
SH-6W	G	G2	LS	0.003	10	224.8	11	12.5	4	0.61	0.75	510.7	536
SH-6W	G	G2	LS	0.002	10	224.8	11	12.5	4	0.61	0.75	510.7	536
SH-6W	G	G2	LS	0.002	10	224.8	11	12.5	4	0.61	0.75	510.7	536
SH-6W	G	G2	LS	0.002	10	224.8	11	12.5	4	0.61	0.75	510.7	536
SH-6W	G	G2	LS	0.003	10	224.8	11	12.5	4	0.61	0.75	510.7	536
SH-6W	G	GN1	LS	0.004	10	0	11	6.4	4	0.61	0.75	556	539
SH-6W	G	G9	LS	0.009	10	224.8	11	8.7	4	0.61	0.75	510.7	536
SH-6W	G	G8	LS	0.008	10	224.8	11	13.2	4	0.61	0.75	510.7	536
SH-6W	G	G7	LS	0.012	10	224.8	11	9.6	4	0.61	0.75	510.7	536
SH-6W	G	G6	LS	0.012	10	224.8	11	10.6	4	0.61	0.75	510.7	536
SH-6W	G	GN2	LS	0.005	10	0	11	9.7	4	0.61	0.75	556	539
SH-6W	G	G3	LS	0.009	10	224.8	11	12.1	4	0.61	0.75	510.7	536
SH-6W	G	G2	LS	0.01	10	224.8	11	12.5	4	0.61	0.75	510.7	536
SH-6W	H	H9	LS	0.003	10	224.8	11	17.5	4	0.68	0.75	510.7	536
SH-6W	H	H9	LS	0.003	10	224.8	11	17.5	4	0.68	0.75	510.7	536
SH-6W	H	H9	LS	0.025	10	224.8	11	17.5	4	0.68	0.75	510.7	536
SH-6W	H	H9	LS	0.002	10	224.8	11	17.5	4	0.68	0.75	510.7	536
SH-6W	H	H9	LS	0.003	10	224.8	11	17.5	4	0.68	0.75	510.7	536
SH-6W	H	H7	LS	0.002	10	224.8	11	11.1	4	0.68	0.75	510.7	536
SH-6W	H	H7	LS	0.002	10	224.8	11	11.1	4	0.68	0.75	510.7	536
SH-6W	H	H7	LS	0.002	10	224.8	11	11.1	4	0.68	0.75	510.7	536
SH-6W	H	H7	LS	0.002	10	224.8	11	11.1	4	0.68	0.75	510.7	536
SH-6W	H	H7	LS	0.002	10	224.8	11	11.1	4	0.68	0.75	510.7	536
SH-6W	H	H6	LS	0.001	10	224.8	11	8.5	4	0.68	0.75	510.7	536
SH-6W	H	H6	LS	0.002	10	224.8	11	8.5	4	0.68	0.75	510.7	536
SH-6W	H	H6	LS	0.001	10	224.8	11	8.5	4	0.68	0.75	510.7	536

SH-6W	H	H6	LS	0.001	10	224.8	11	8.5	4	0.68	0.75	510.7	536
SH-6W	H	H6	LS	0.002	10	224.8	11	8.5	4	0.68	0.75	510.7	536
SH-6W	H	H5	LS	0.001	10	224.8	11	12.7	4	0.68	0.75	510.7	536
SH-6W	H	H5	LS	0.002	10	224.8	11	12.7	4	0.68	0.75	510.7	536
SH-6W	H	H5	LS	0.002	10	224.8	11	12.7	4	0.68	0.75	510.7	536
SH-6W	H	H5	LS	0.002	10	224.8	11	12.7	4	0.68	0.75	510.7	536
SH-6W	H	H5	LS	0.002	10	224.8	11	12.7	4	0.68	0.75	510.7	536
SH-6W	H	H3	LS	0.002	10	224.8	11	.	4	0.68	0.75	510.7	536
SH-6W	H	H3	LS	0.003	10	224.8	11	.	4	0.68	0.75	510.7	536
SH-6W	H	H3	LS	0.002	10	224.8	11	.	4	0.68	0.75	510.7	536
SH-6W	H	H3	LS	0.002	10	224.8	11	.	4	0.68	0.75	510.7	536
SH-6W	H	H3	LS	0.001	10	224.8	11	.	4	0.68	0.75	510.7	536
SH-6W	H	H9	LS	0.01	10	224.8	11	15.2	4	0.68	0.75	510.7	536
SH-6W	H	H7	LS	0.01	10	224.8	11	8.8	4	0.68	0.75	510.7	536
SH-6W	H	H6	LS	0.006	10	224.8	11	8.5	4	0.68	0.75	510.7	536
SH-6W	H	H5	LS	0.006	10	224.8	11	5.3	4	0.68	0.75	510.7	536
SH-6W	H	HN1	LS	0.001	10	0	11	3.6	4	0.68	0.75	556	539
SH-6W	H	HN2	LS	0.004	10	0	11	5	4	0.68	0.75	556	539
SH-6W	H	H3	LS	0.002	10	0	11	7.6	4	0.68	0.75	556	539
SH-6W	H	HN3	LS	0.01	10	224.8	11	.	4	0.68	0.75	510.7	536

PRO	S	ID	AGG.	CW	Temp	∂ Temp	Z	D	L	λ	SOIL	% steel	Ø	FT	E	Day
BW-8	A	A7	SRG	0.015	54.4	15.1	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A7	SRG	0.019	42.7	26.8	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A7	SRG	0.002	44.2	25.3	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A7	SRG	0.017	47.6	21.9	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A7	SRG	0.018	48.8	20.7	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.011	54.4	15.1	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.021	42.7	26.8	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.020	44.2	25.3	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.015	47.6	21.9	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.016	48.8	20.7	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.012	54.4	15.1	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.022	42.7	26.8	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.020	44.2	25.3	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.016	47.6	21.9	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.013	48.8	20.7	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A16	SRG	0.014	54.4	15.1	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A16	SRG	0.022	42.7	26.8	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A16	SRG	0.021	44.2	25.3	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A16	SRG	0.017	47.6	21.9	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A16	SRG	0.016	48.8	20.7	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A22	SRG	0.015	54.4	15.1	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A22	SRG	0.016	42.7	26.8	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A22	SRG	0.017	44.2	25.3	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A22	SRG	0.016	47.6	21.9	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A22	SRG	0.015	48.8	20.7	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.012	54.4	15.1	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.019	42.7	26.8	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.019	44.2	25.3	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.014	47.6	21.9	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.014	48.8	20.7	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A24	SRG	0.010	54.4	15.1	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A24	SRG	0.018	42.7	26.8	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A24	SRG	0.017	44.2	25.3	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A24	SRG	0.013	47.6	21.9	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A24	SRG	0.008	48.8	20.7	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A26	SRG	0.014	54.4	15.1	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A26	SRG	0.023	42.7	26.8	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A26	SRG	0.020	44.2	25.3	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A26	SRG	0.017	47.6	21.9	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A26	SRG	0.016	48.8	20.7	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A26	SRG	0.012	63.2	6.3	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A26	SRG	0.011	63.2	6.3	2.562E-06	10	.	0.0000084	4	0.62	0.75	557	4680000	21
BW-8	A	A22	SRG	0.009	63.2	6.3	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A22	SRG	0.018	63.2	6.3	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A22	SRG	0.019	63.2	6.3	6.326E-06	10	6.15	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.020	63.2	6.3	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A23	SRG	0.015	63.2	6.3	6.326E-06	10	4.5	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A7	SRG	0.009	63.2	6.3	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A7	SRG	0.012	63.2	6.3	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A7	SRG	0.014	63.2	6.3	0.00000864	10	7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.021	63.2	6.3	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.013	63.2	6.3	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A9	SRG	0.017	63.2	6.3	0.00000864	10	6	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.019	63.2	6.3	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A13	SRG	0.018	63.2	6.3	0.00000864	10	10.7	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A24	SRG	0.014	63.2	6.3	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A24	SRG	0.020	63.2	6.3	6.326E-06	10	13	0.0000084	4	0.62	0.75	542	4660000	11
BW-8	A	A16	SRG	0.023	63.2	6.3	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	A	A16	SRG	0.020	63.2	6.3	0.00000864	10	6.5	0.0000084	4	0.62	0.75	458	4550000	5
BW-8	B	B4	SRG	0.012	54.4	15.5	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B4	SRG	0.020	42.7	27.2	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B4	SRG	0.018	44.2	25.7	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B4	SRG	0.015	47.6	22.3	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B4	SRG	0.060	48.8	21.1	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B6	SRG	0.014	54.4	15.5	0.00000864	10	5.3	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B6	SRG	0.022	42.7	27.2	0.00000864	10	5.3	0.0000084	4	0.5	0.75	458	4550000	5

BW-8	B	B6	SRG	0.020	44.2	25.7	0.00000864	10	5.3	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B6	SRG	0.018	47.6	22.3	0.00000864	10	5.3	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B6	SRG	0.017	48.8	21.1	0.00000864	10	5.3	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B10	SRG	0.017	54.4	15.5	8.251E-06	10	7.5	0.0000084	4	0.5	0.75	485	4595000	6
BW-8	B	B10	SRG	0.022	42.7	27.2	8.251E-06	10	7.5	0.0000084	4	0.5	0.75	485	4595000	6
BW-8	B	B10	SRG	0.021	44.2	25.7	8.251E-06	10	7.5	0.0000084	4	0.5	0.75	485	4595000	6
BW-8	B	B10	SRG	0.020	47.6	22.3	8.251E-06	10	7.5	0.0000084	4	0.5	0.75	485	4595000	6
BW-8	B	B10	SRG	0.017	48.8	21.1	8.251E-06	10	7.5	0.0000084	4	0.5	0.75	485	4595000	6
BW-8	B	B14	SRG	0.010	54.4	15.5	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	B14	SRG	0.018	42.7	27.2	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	B14	SRG	0.017	44.2	25.7	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	B14	SRG	0.013	47.6	22.3	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	B14	SRG	0.014	48.8	21.1	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	B15	SRG	0.010	54.4	15.5	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B15	SRG	0.018	42.7	27.2	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B15	SRG	0.016	44.2	25.7	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B15	SRG	0.013	47.6	22.3	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B15	SRG	0.014	48.8	21.1	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.012	54.4	15.5	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.020	42.7	27.2	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.016	44.2	25.7	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.015	47.6	22.3	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.015	48.8	21.1	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B18	SRG	0.015	54.4	15.5	6.326E-06	10	10.3	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B18	SRG	0.022	42.7	27.2	6.326E-06	10	10.3	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B18	SRG	0.020	44.2	25.7	6.326E-06	10	10.3	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B18	SRG	0.017	47.6	22.3	6.326E-06	10	10.3	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B18	SRG	0.012	48.8	21.1	6.326E-06	10	10.3	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B21	SRG	0.011	54.4	15.5	2.562E-06	10	7.6	0.0000084	4	0.5	0.75	557	4680000	21
BW-8	B	B21	SRG	0.016	42.7	27.2	2.562E-06	10	7.6	0.0000084	4	0.5	0.75	557	4680000	21
BW-8	B	B21	SRG	0.015	44.2	25.7	2.562E-06	10	7.6	0.0000084	4	0.5	0.75	557	4680000	21
BW-8	B	B21	SRG	0.011	47.6	22.3	2.562E-06	10	7.6	0.0000084	4	0.5	0.75	557	4680000	21
BW-8	B	B21	SRG	0.011	48.8	21.1	2.562E-06	10	7.6	0.0000084	4	0.5	0.75	557	4680000	21
BW-8	B	B15	SRG	0.010	65.4	4.5	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B15	SRG	0.016	65.4	4.5	6.326E-06	10	.	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.018	65.4	4.5	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B16	SRG	0.025	65.4	4.5	6.326E-06	10	9.8	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	B	B4	SRG	0.016	65.4	4.5	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B4	SRG	0.006	65.4	4.5	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B4	SRG	0.008	65.4	4.5	0.00000864	10	9.7	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B21	SRG	0.015	65.4	4.5	2.562E-06	10	7.6	0.0000084	4	0.5	0.75	557	4680000	21
BW-8	B	B6	SRG	0.020	65.4	4.5	0.00000864	10	5.3	0.0000084	4	0.5	0.75	458	4550000	5
BW-8	B	B10	SRG	0.010	65.4	4.5	8.251E-06	10	7.5	0.0000084	4	0.5	0.75	485	4595000	6
BW-8	B	B14	SRG	0.015	65.4	4.5	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	B14	SRG	0.012	65.4	4.5	0.00000786	10	8.7	0.0000084	4	0.5	0.75	504	5040000	7
BW-8	B	NEW	SRG	0.007	65.4	4.5	0	10	3.5	0.0000084	4	0.5	0.75	0	4680000	28
BW-8	B	NEW	SRG	0.005	65.4	4.5	0	10	3.5	0.0000084	4	0.5	0.75	0	4680000	28
BW-8	B	B18	SRG	0.015	65.4	4.5	9.029E-06	10	10.3	0.0000084	4	0.5	0.75	542	4660000	11
BW-8	C	C3	SRG	0.013	54.4	15.9	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C3	SRG	0.022	42.7	27.6	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C3	SRG	0.021	44.2	26.1	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C3	SRG	0.015	47.6	22.7	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C3	SRG	0.017	48.8	21.5	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C5	SRG	0.017	54.4	15.9	6.326E-06	10	10.3	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C5	SRG	0.026	42.7	27.6	6.326E-06	10	10.3	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C5	SRG	0.024	44.2	26.1	6.326E-06	10	10.3	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C5	SRG	0.020	47.6	22.7	6.326E-06	10	10.3	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C5	SRG	0.021	48.8	21.5	6.326E-06	10	10.3	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C8	SRG	0.016	54.4	15.9	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C8	SRG	0.026	42.7	27.6	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C8	SRG	0.023	44.2	26.1	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C8	SRG	0.021	47.6	22.7	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C8	SRG	0.021	48.8	21.5	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C11	SRG	0.012	54.4	15.9	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C11	SRG	0.022	42.7	27.6	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C11	SRG	0.017	44.2	26.1	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C11	SRG	0.017	47.6	22.7	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5

BW-8	C	C11	SRG	0.016	48.8	21.5	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.013	54.4	15.9	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.025	42.7	27.6	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.024	44.2	26.1	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.020	47.6	22.7	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.018	48.8	21.5	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C18	SRG	0.014	54.4	15.9	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C18	SRG	0.027	42.7	27.6	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C18	SRG	0.023	44.2	26.1	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C18	SRG	0.020	47.6	22.7	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C18	SRG	0.018	48.8	21.5	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C19	SRG	0.015	54.4	15.9	2.562E-06	10	.	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C19	SRG	0.021	42.7	27.6	2.562E-06	10	.	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C19	SRG	0.021	44.2	26.1	2.562E-06	10	.	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C19	SRG	0.018	47.6	22.7	2.562E-06	10	.	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C19	SRG	0.017	48.8	21.5	2.562E-06	10	.	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C20	SRG	0.015	54.4	15.9	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C20	SRG	0.025	42.7	27.6	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C20	SRG	0.022	44.2	26.1	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C20	SRG	0.023	47.6	22.7	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C20	SRG	0.019	48.8	21.5	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C19	SRG	0.023	65.4	4.9	5.944E-06	10	.	0.0000084	4	0.38	0.75	546	4670000	12
BW-8	C	C19	SRG	0.025	65.4	4.9	2.562E-06	10	.	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C8	SRG	0.030	65.4	4.9	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C8	SRG	0.017	65.4	4.9	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C8	SRG	0.012	65.4	4.9	0.00000864	10	11.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C18	SRG	0.020	65.4	4.9	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C18	SRG	0.018	65.4	4.9	0.00000786	10	12.2	0.0000084	4	0.38	0.75	504	5040000	7
BW-8	C	C3	SRG	0.021	65.4	4.9	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C3	SRG	0.014	65.4	4.9	6.326E-06	10	11.2	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	C	C20	SRG	0.021	65.4	4.9	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C20	SRG	0.045	65.4	4.9	2.562E-06	10	10.5	0.0000084	4	0.38	0.75	557	4680000	21
BW-8	C	C11	SRG	0.020	65.4	4.9	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C11	SRG	0.020	65.4	4.9	0.00000864	10	8.1	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.035	65.4	4.9	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	C14	SRG	0.028	65.4	4.9	0.00000864	10	8.8	0.0000084	4	0.38	0.75	458	4550000	5
BW-8	C	NEW	SRG	0.005	65.4	4.9	0	10	1.5	0.0000084	4	0.38	0.75	0	4680000	28
BW-8	C	C5	SRG	0.021	65.4	4.9	6.326E-06	10	8.8	0.0000084	4	0.38	0.75	419	4420000	4
BW-8	D	D5	SRG	0.011	54.4	17.5	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D5	SRG	0.023	42.7	29.2	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D5	SRG	0.021	44.2	27.7	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D5	SRG	0.017	47.6	24.3	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D5	SRG	0.016	48.8	23.1	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D10	SRG	0.011	54.4	17.5	8.251E-06	10	12.9	0.0000084	4	0.48	0.88	485	4595000	6
BW-8	D	D10	SRG	0.022	42.7	29.2	8.251E-06	10	12.9	0.0000084	4	0.48	0.88	485	4595000	6
BW-8	D	D10	SRG	0.021	44.2	27.7	8.251E-06	10	12.9	0.0000084	4	0.48	0.88	485	4595000	6
BW-8	D	D10	SRG	0.017	47.6	24.3	8.251E-06	10	12.9	0.0000084	4	0.48	0.88	485	4595000	6
BW-8	D	D10	SRG	0.016	48.8	23.1	8.251E-06	10	12.9	0.0000084	4	0.48	0.88	485	4595000	6
BW-8	D	D13	SRG	0.013	54.4	17.5	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D13	SRG	0.022	42.7	29.2	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D13	SRG	0.019	44.2	27.7	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D13	SRG	0.017	47.6	24.3	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D13	SRG	0.015	48.8	23.1	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D20	SRG	0.011	54.4	17.5	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D20	SRG	0.020	42.7	29.2	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D20	SRG	0.018	44.2	27.7	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D20	SRG	0.016	47.6	24.3	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D20	SRG	0.016	48.8	23.1	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D16	SRG	0.011	54.4	17.5	6.326E-06	10	6.9	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D16	SRG	0.017	42.7	29.2	6.326E-06	10	6.9	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D16	SRG	0.017	44.2	27.7	6.326E-06	10	6.9	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D16	SRG	0.014	47.6	24.3	6.326E-06	10	6.9	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D16	SRG	0.013	48.8	23.1	6.326E-06	10	6.9	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D17	SRG	0.013	54.4	17.5	6.326E-06	10	11	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D17	SRG	0.021	42.7	29.2	6.326E-06	10	11	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D17	SRG	0.022	44.2	27.7	6.326E-06	10	11	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D17	SRG	0.018	47.6	24.3	6.326E-06	10	11	0.0000084	4	0.48	0.88	542	4660000	11

BW-8	D	D17	SRG	0.015	48.8	23.1	6.326E-06	10	11	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D19	SRG	0.016	54.4	17.5	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D19	SRG	0.029	42.7	29.2	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D19	SRG	0.026	44.2	27.7	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D19	SRG	0.021	47.6	24.3	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D19	SRG	0.020	48.8	23.1	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D22	SRG	0.013	54.4	17.5	2.562E-06	10	8.3	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	D22	SRG	0.020	42.7	29.2	2.562E-06	10	8.3	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	D22	SRG	0.018	44.2	27.7	2.562E-06	10	8.3	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	D22	SRG	0.015	47.6	24.3	2.562E-06	10	8.3	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	D16	SRG	0.013	67.4	4.5	2.562E-06	10	6.9	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	D5	SRG	0.013	67.4	4.5	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D5	SRG	0.017	67.4	4.5	0.00000864	10	7.7	0.0000084	4	0.48	0.88	458	4550000	5
BW-8	D	D22	SRG	0.010	67.4	4.5	2.562E-06	10	8.3	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	D22	SRG	0.016	67.4	4.5	2.562E-06	10	8.3	0.0000084	4	0.48	0.88	557	4680000	21
BW-8	D	NEW	SRG	0.006	67.4	4.5	0	10	4.1	0.0000084	4	0.48	0.88	0	4680000	28
BW-8	D	D10	SRG	0.016	67.4	4.5	8.251E-06	10	11.4	0.0000084	4	0.48	0.88	485	4595000	6
BW-8	D	D13	SRG	0.018	67.4	4.5	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D13	SRG	0.014	67.4	4.5	0.00000786	10	10.5	0.0000084	4	0.48	0.88	504	5040000	7
BW-8	D	D20	SRG	0.022	67.4	4.5	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D19	SRG	0.018	67.4	4.5	6.326E-06	10	9.7	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	D	D17	SRG	0.010	67.4	4.5	6.326E-06	10	11	0.0000084	4	0.48	0.88	542	4660000	11
BW-8	E	E5	LS	0.014	54.4	20.9	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E5	LS	0.019	42.7	32.6	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E5	LS	0.017	44.2	31.1	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E5	LS	0.014	47.6	27.7	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E5	LS	0.015	48.8	26.5	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E7	LS	0.007	54.4	20.9	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E7	LS	0.013	42.7	32.6	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E7	LS	0.010	44.2	31.1	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E7	LS	0.009	47.6	27.7	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E7	LS	0.008	48.8	26.5	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E10	LS	0.011	54.4	20.9	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E10	LS	0.016	42.7	32.6	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E10	LS	0.017	44.2	31.1	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E10	LS	0.013	47.6	27.7	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E10	LS	0.012	48.8	26.5	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E11	LS	0.006	54.4	20.9	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6
BW-8	E	E11	LS	0.011	42.7	32.6	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6
BW-8	E	E11	LS	0.011	44.2	31.1	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6
BW-8	E	E11	LS	0.009	47.6	27.7	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6
BW-8	E	E11	LS	0.008	48.8	26.5	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6
BW-8	E	E13	LS	0.010	54.4	20.9	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E13	LS	0.015	42.7	32.6	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E13	LS	0.015	44.2	31.1	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E13	LS	0.013	47.6	27.7	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E13	LS	0.011	48.8	26.5	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E15	LS	0.010	54.4	20.9	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E15	LS	0.016	42.7	32.6	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E15	LS	0.015	44.2	31.1	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E15	LS	0.013	47.6	27.7	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E15	LS	0.011	48.8	26.5	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E17	LS	0.009	54.4	20.9	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E17	LS	0.015	42.7	32.6	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E17	LS	0.014	44.2	31.1	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E17	LS	0.011	47.6	27.7	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E17	LS	0.010	48.8	26.5	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.004	54.4	20.9	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.006	42.7	32.6	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.007	44.2	31.1	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.006	47.6	27.7	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.006	48.8	26.5	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E5	LS	0.015	72.4	2.9	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E5	LS	0.015	72.4	2.9	2.8117E-06	10	.	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	N1	LS	0.005	72.4	2.9	0	10	2.5	0.0000055	4	0.56	0.88	0	4140000	28
BW-8	E	N1	LS	0.006	72.4	2.9	0	10	2.5	0.0000055	4	0.56	0.88	0	4140000	28
BW-8	E	E11	LS	0.014	72.4	2.9	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6

BW-8	E	E11	LS	0.014	72.4	2.9	2.6867E-06	10	8.7	0.0000055	4	0.56	0.88	397	4060000	6
BW-8	E	E7	LS	0.018	72.4	2.9	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E7	LS	0.019	72.4	2.9	2.8117E-06	10	7.4	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E17	LS	0.017	72.4	2.9	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E17	LS	0.011	72.4	2.9	9.63E-07	10	5.5	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.017	72.4	2.9	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.008	72.4	2.9	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E19	LS	0.014	72.4	2.9	9.63E-07	10	11.2	0.0000055	4	0.56	0.88	473	4140000	20
BW-8	E	E13	LS	0.019	72.4	2.9	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E13	LS	0.020	72.4	2.9	2.189E-06	10	11.6	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E10	LS	0.020	72.4	2.9	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	E10	LS	0.011	72.4	2.9	2.8117E-06	10	12.8	0.0000055	4	0.56	0.88	380	4000000	5
BW-8	E	N2	LS	0.003	72.4	2.9	0	10	4.4	0.0000055	4	0.56	0.88	0	4140000	28
BW-8	E	E15	LS	0.009	72.4	2.9	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	E	E15	LS	0.011	72.4	2.9	2.189E-06	10	9.5	0.0000055	4	0.56	0.88	0	4120000	10
BW-8	F	F1	LS	0.016	54.4	21.6	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F1	LS	0.018	42.7	33.3	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F1	LS	0.020	44.2	31.8	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F1	LS	0.018	47.6	28.4	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F1	LS	0.020	48.8	27.2	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F5	LS	0.014	54.4	21.6	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F5	LS	0.023	42.7	33.3	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F5	LS	0.019	44.2	31.8	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F5	LS	0.016	47.6	28.4	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F5	LS	0.016	48.8	27.2	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F8	LS	0.018	54.4	21.6	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F8	LS	0.025	42.7	33.3	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F8	LS	0.023	44.2	31.8	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F8	LS	0.022	47.6	28.4	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F8	LS	0.020	48.8	27.2	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F10	LS	0.012	54.4	21.6	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F10	LS	0.020	42.7	33.3	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F10	LS	0.090	44.2	31.8	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F10	LS	0.016	47.6	28.4	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F10	LS	0.016	48.8	27.2	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F12	LS	0.015	54.4	21.6	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	F	F12	LS	0.023	42.7	33.3	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	F	F12	LS	0.022	44.2	31.8	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	F	F12	LS	0.020	47.6	28.4	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	F	F12	LS	0.014	48.8	27.2	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	F	F14	LS	0.009	54.4	21.6	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	F14	LS	0.013	42.7	33.3	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	F14	LS	0.011	44.2	31.8	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	F14	LS	0.010	47.6	28.4	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	F14	LS	0.010	48.8	27.2	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	F15	LS	0.015	54.4	21.6	9.63E-07	10	11.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F15	LS	0.021	42.7	33.3	9.63E-07	10	11.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F15	LS	0.020	44.2	31.8	9.63E-07	10	11.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F15	LS	0.017	47.6	28.4	9.63E-07	10	11.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F15	LS	0.015	48.8	27.2	9.63E-07	10	11.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F16	LS	0.015	54.4	21.6	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F16	LS	0.021	42.7	33.3	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F16	LS	0.019	44.2	31.8	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F16	LS	0.015	47.6	28.4	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F16	LS	0.013	48.8	27.2	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F14	LS	0.013	73.8	2.2	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	F14	LS	0.014	73.8	2.2	1.819E-06	10	9	0.0000055	4	0.45	0.75	456	4130000	13
BW-8	F	NEW	LS	0.003	73.8	2.2	0	10	5.3	0.0000055	4	0.45	0.75	0	4140000	28
BW-8	F	F5	LS	0.017	73.8	2.2	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F5	LS	0.020	73.8	2.2	2.8117E-06	10	10.7	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F15	LS	0.022	73.8	2.2	9.63E-07	10	11.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F1	LS	0.020	73.8	2.2	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F1	LS	0.017	73.8	2.2	3.1062E-06	10	9.5	0.0000055	4	0.45	0.75	329	3720000	3
BW-8	F	F16	LS	0.018	73.8	2.2	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F16	LS	0.014	73.8	2.2	9.63E-07	10	7.8	0.0000055	4	0.45	0.75	473	4140000	20
BW-8	F	F8	LS	0.025	73.8	2.2	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F8	LS	0.018	73.8	2.2	2.8117E-06	10	7.5	0.0000055	4	0.45	0.75	380	4000000	5

BW-8	F	F10	LS	0.013	73.8	2.2	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F10	LS	0.020	73.8	2.2	2.8117E-06	10	13.1	0.0000055	4	0.45	0.75	380	4000000	5
BW-8	F	F12	LS	0.019	73.8	2.2	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	F	F12	LS	0.020	73.8	2.2	2.189E-06	10	11.6	0.0000055	4	0.45	0.75	0	4120000	10
BW-8	G	G2	LS	0.010	54.4	27.3	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G2	LS	0.016	42.7	39	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G2	LS	0.015	44.2	37.5	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G2	LS	0.013	47.6	34.1	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G2	LS	0.012	48.8	32.9	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G4	LS	0.007	54.4	27.3	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G4	LS	0.013	42.7	39	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G4	LS	0.014	44.2	37.5	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G4	LS	0.011	47.6	34.1	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G4	LS	0.010	48.8	32.9	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G9	LS	0.007	54.4	27.3	2.8117E-06	10	8.1	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G9	LS	0.010	42.7	39	2.8117E-06	10	8.1	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G9	LS	0.009	44.2	37.5	2.8117E-06	10	8.1	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G9	LS	0.007	47.6	34.1	2.8117E-06	10	8.1	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G9	LS	0.008	48.8	32.9	2.8117E-06	10	8.1	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G13	LS	0.010	54.4	27.3	2.6867E-06	10	9.1	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	G13	LS	0.015	42.7	39	2.6867E-06	10	9.1	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	G13	LS	0.013	44.2	37.5	2.6867E-06	10	9.1	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	G13	LS	0.012	47.6	34.1	2.6867E-06	10	9.1	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	G13	LS	0.012	48.8	32.9	2.6867E-06	10	9.1	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	G15	LS	0.010	54.4	27.3	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G15	LS	0.013	42.7	39	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G15	LS	0.013	44.2	37.5	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G15	LS	0.011	47.6	34.1	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G15	LS	0.010	48.8	32.9	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.008	54.4	27.3	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.013	42.7	39	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.012	44.2	37.5	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.011	47.6	34.1	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.011	48.8	32.9	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G17	LS	0.006	54.4	27.3	2.189E-06	10	9.3	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G17	LS	0.013	42.7	39	2.189E-06	10	9.3	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G17	LS	0.011	44.2	37.5	2.189E-06	10	9.3	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G17	LS	0.008	47.6	34.1	2.189E-06	10	9.3	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G17	LS	0.007	48.8	32.9	2.189E-06	10	9.3	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G21	LS	0.013	54.4	27.3	1.819E-06	10	10.2	0.0000055	4	0.58	0.75	456	4130000	13
BW-8	G	G21	LS	0.016	42.7	39	1.819E-06	10	10.2	0.0000055	4	0.58	0.75	456	4130000	13
BW-8	G	G21	LS	0.016	44.2	37.5	1.819E-06	10	10.2	0.0000055	4	0.58	0.75	456	4130000	13
BW-8	G	G21	LS	0.014	47.6	34.1	1.819E-06	10	10.2	0.0000055	4	0.58	0.75	456	4130000	13
BW-8	G	G21	LS	0.013	48.8	32.9	1.819E-06	10	10.2	0.0000055	4	0.58	0.75	456	4130000	13
BW-8	G	N1	LS	0.004	73.4	8.3	0	10	4.7	0.0000055	4	0.58	0.75	0	4140000	28
BW-8	G	N1	LS	0.005	73.4	8.3	0	10	4.7	0.0000055	4	0.58	0.75	0	4140000	28
BW-8	G	G9	LS	0.011	73.4	8.3	2.8117E-06	10	7.4	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G9	LS	0.017	73.4	8.3	2.8117E-06	10	7.4	0.0000055	4	0.58	0.75	380	4000000	5
BW-8	G	G15	LS	0.016	73.4	8.3	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G15	LS	0.012	73.4	8.3	2.189E-06	10	5.4	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.015	73.4	8.3	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G16	LS	0.009	73.4	8.3	2.189E-06	10	8.9	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G21	LS	0.017	73.4	8.3	1.819E-06	10	10.2	0.0000055	4	0.58	0.75	456	4130000	13
BW-8	G	G2	LS	0.015	73.4	8.3	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G2	LS	0.012	73.4	8.3	3.1062E-06	10	12.5	0.0000055	4	0.58	0.75	329	3720000	3
BW-8	G	G4	LS	0.010	73.4	8.3	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G4	LS	0.007	73.4	8.3	2.9368E-06	10	11.2	0.0000055	4	0.58	0.75	358	3860000	4
BW-8	G	G17	LS	0.012	73.4	8.3	2.189E-06	10	8.5	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G17	LS	0.007	73.4	8.3	2.189E-06	10	8.5	0.0000055	4	0.58	0.75	0	4120000	10
BW-8	G	G13	LS	0.009	73.4	8.3	2.6867E-06	10	5.7	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	G13	LS	0.010	73.4	8.3	2.6867E-06	10	5.7	0.0000055	4	0.58	0.75	397	4060000	6
BW-8	G	N2	LS	0.002	73.4	8.3	0	10	4.9	0.0000055	4	0.58	0.75	0	4140000	28
BW-8	H	H1	LS	0.008	54.4	22.5	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3
BW-8	H	H1	LS	0.012	42.7	34.2	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3
BW-8	H	H1	LS	0.011	44.2	32.7	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3
BW-8	H	H1	LS	0.009	47.6	29.3	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3
BW-8	H	H1	LS	0.008	48.8	28.1	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3

BW-8	H	H2	LS	0.008	54.4	22.5	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H2	LS	0.012	42.7	34.2	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H2	LS	0.012	44.2	32.7	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H2	LS	0.010	47.6	29.3	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H2	LS	0.010	48.8	28.1	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H4	LS	0.007	54.4	22.5	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H4	LS	0.010	42.7	34.2	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H4	LS	0.011	44.2	32.7	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H4	LS	0.009	47.6	29.3	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H4	LS	0.008	48.8	28.1	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H5	LS	0.010	54.4	22.5	2.9368E-06	10	3.3	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H5	LS	0.012	42.7	34.2	2.9368E-06	10	3.3	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H5	LS	0.012	44.2	32.7	2.9368E-06	10	3.3	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H5	LS	0.010	47.6	29.3	2.9368E-06	10	3.3	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H5	LS	0.011	48.8	28.1	2.9368E-06	10	3.3	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H12	LS	0.006	54.4	22.5	2.8117E-06	10	8.7	0.0000055	4	0.67	0.75	380	4000000	5
BW-8	H	H12	LS	0.010	42.7	34.2	2.8117E-06	10	8.7	0.0000055	4	0.67	0.75	380	4000000	5
BW-8	H	H12	LS	0.011	44.2	32.7	2.8117E-06	10	8.7	0.0000055	4	0.67	0.75	380	4000000	5
BW-8	H	H12	LS	0.009	47.6	29.3	2.8117E-06	10	8.7	0.0000055	4	0.67	0.75	380	4000000	5
BW-8	H	H12	LS	0.008	48.8	28.1	2.8117E-06	10	8.7	0.0000055	4	0.67	0.75	380	4000000	5
BW-8	H	H15	LS	0.008	54.4	22.5	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H15	LS	0.011	42.7	34.2	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H15	LS	0.011	44.2	32.7	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H15	LS	0.010	47.6	29.3	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H15	LS	0.010	48.8	28.1	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H16	LS	0.008	54.4	22.5	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H16	LS	0.013	42.7	34.2	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H16	LS	0.013	44.2	32.7	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H16	LS	0.011	47.6	29.3	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H16	LS	0.010	48.8	28.1	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H17	LS	0.012	42.7	34.2	2.189E-06	10	8.3	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H17	LS	0.011	44.2	32.7	2.189E-06	10	8.3	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H17	LS	0.010	47.6	29.3	2.189E-06	10	8.3	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H17	LS	0.010	48.8	28.1	2.189E-06	10	8.3	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H2	LS	0.007	72.2	4.7	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H2	LS	0.013	72.2	4.7	2.9368E-06	10	4	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H16	LS	0.012	72.2	4.7	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H16	LS	0.008	72.2	4.7	2.189E-06	10	7.5	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H17	LS	0.011	72.2	4.7	2.189E-06	10	8.3	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H17	LS	0.008	72.2	4.7	2.189E-06	10	8.3	0.0000055	4	0.67	0.75	0	4120000	10
BW-8	H	H1	LS	0.010	72.2	4.7	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3
BW-8	H	H1	LS	0.007	72.2	4.7	3.1062E-06	10	8.2	0.0000055	4	0.67	0.75	329	3720000	3
BW-8	H	H4	LS	0.010	72.2	4.7	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H4	LS	0.014	72.2	4.7	2.9368E-06	10	8.7	0.0000055	4	0.67	0.75	358	3860000	4
BW-8	H	H15	LS	0.007	72.2	4.7	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H15	LS	0.007	72.2	4.7	2.6867E-06	10	2.3	0.0000055	4	0.67	0.75	397	4060000	6
BW-8	H	H12	LS	0.011	72.2	4.7	2.8117E-06	10	8.7	0.0000055	4	0.67	0.75	380	4000000	5
BW-8	H	H5	LS	0.010	72.2	4.7	2.9368E-06	10	3.3	0.0000055	4	0.67	0.75	358	3860000	4

Projec	S	ID	AGG.	CW	TEMP	∂ Temp	Z	D	L	A	SOIL	% steel	Ø	FT	E	Day
IH-45	A	A23	SRG	0.007	58.2	19.9	7.559E-07	15	.	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A23	SRG	0.003	61.3	16.8	7.559E-07	15	.	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A23	SRG	0.002	62.2	15.9	7.559E-07	15	.	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A23	SRG	0.003	70.2	7.9	7.559E-07	15	.	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A23	SRG	0.0025	65.7	12.4	7.559E-07	15	.	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A24	SRG	0.008	58.2	19.9	7.559E-07	15	17	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A24	SRG	0.005	61.3	16.8	7.559E-07	15	17	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A24	SRG	0.002	62.2	15.9	7.559E-07	15	17	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A24	SRG	0.003	70.2	7.9	7.559E-07	15	17	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A24	SRG	0.003	65.7	12.4	7.559E-07	15	17	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A26	SRG	0.01	58.2	19.9	7.559E-07	15	4.3	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A26	SRG	0.008	61.3	16.8	7.559E-07	15	4.3	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A26	SRG	0.007	62.2	15.9	7.559E-07	15	4.3	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A26	SRG	0.004	70.2	7.9	7.559E-07	15	4.3	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A26	SRG	0.0045	65.7	12.4	7.559E-07	15	4.3	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A2	SRG	0.01	58.2	19.9	1.043E-06	15	1.5	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A2	SRG	0.009	61.3	16.8	1.043E-06	15	1.5	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A2	SRG	0.007	62.2	15.9	1.043E-06	15	1.5	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A2	SRG	0.005	70.2	7.9	1.043E-06	15	1.5	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A2	SRG	0.006	65.7	12.4	1.043E-06	15	1.5	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A3	SRG	0.017	58.2	19.9	1.043E-06	15	8.2	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A3	SRG	0.013	61.3	16.8	1.043E-06	15	8.2	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A3	SRG	0.011	62.2	15.9	1.043E-06	15	8.2	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A3	SRG	0.007	70.2	7.9	1.043E-06	15	8.2	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A3	SRG	0.0045	65.7	12.4	1.043E-06	15	8.2	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A6	SRG	0.013	58.2	19.9	1.043E-06	15	5.4	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A6	SRG	0.01	61.3	16.8	1.043E-06	15	5.4	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A6	SRG	0.008	62.2	15.9	1.043E-06	15	5.4	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A6	SRG	0.007	70.2	7.9	1.043E-06	15	5.4	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A6	SRG	0.005	65.7	12.4	1.043E-06	15	5.4	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A23	SRG	0.015	56.4	21.71	7.559E-07	15	.	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A24	SRG	0.014	56.4	21.71	7.559E-07	15	2.7	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	N1	SRG	0.005	56.4	21.71	0	15	1.3	0.0000066	4	0.76	0.75	465	5500000	28
IH-45	A	A26	SRG	0.01	56.4	21.71	7.559E-07	15	4.3	0.0000066	4	0.76	0.75	455	5485000	12
IH-45	A	A2	SRG	0.01	56.4	21.71	1.043E-06	15	1.5	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	A3	SRG	0.018	56.4	21.71	1.043E-06	15	2.8	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	A	N2	SRG	0.006	56.4	21.71	0	15	6.9	0.0000066	4	0.76	0.75	465	5500000	28
IH-45	A	N3	SRG	0.002	56.4	21.71	0	15	4.8	0.0000066	4	0.76	0.75	465	5500000	28
IH-45	A	A6	SRG	0.016	56.4	21.71	1.043E-06	15	2.9	0.0000066	4	0.76	0.75	404	5395000	6
IH-45	B	B26	SRG	0.01	58.2	19.9	7.559E-07	15	.	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B26	SRG	0.009	61.3	16.8	7.559E-07	15	.	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B26	SRG	0.08	62.2	15.9	7.559E-07	15	.	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B26	SRG	0.006	70.2	7.9	7.559E-07	15	.	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B26	SRG	0.005	65.7	12.4	7.559E-07	15	.	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B2	SRG	0.011	58.2	19.9	1.043E-06	15	5.9	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B2	SRG	0.009	61.3	16.8	1.043E-06	15	5.9	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B2	SRG	0.007	62.2	15.9	1.043E-06	15	5.9	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B2	SRG	0.005	70.2	7.9	1.043E-06	15	5.9	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B2	SRG	0.0055	65.7	12.4	1.043E-06	15	5.9	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B27	SRG	0.007	58.2	19.9	7.559E-07	15	5.5	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B27	SRG	0.006	61.3	16.8	7.559E-07	15	5.5	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B27	SRG	0.004	62.2	15.9	7.559E-07	15	5.5	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B27	SRG	0.009	70.2	7.9	7.559E-07	15	5.5	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B27	SRG	0.007	65.7	12.4	7.559E-07	15	5.5	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B4	SRG	0.012	58.2	19.9	1.043E-06	15	15	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B4	SRG	0.007	61.3	16.8	1.043E-06	15	15	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B4	SRG	0.007	62.2	15.9	1.043E-06	15	15	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B6	SRG	0.016	58.2	19.9	1.043E-06	15	12	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B6	SRG	0.009	61.3	16.8	1.043E-06	15	12	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B6	SRG	0.007	62.2	15.9	1.043E-06	15	12	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B6	SRG	0.011	70.2	7.9	1.043E-06	15	12	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	B6	SRG	0.008	65.7	12.4	1.043E-06	15	12	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B28	SRG	0.008	58.2	19.9	7.559E-07	15	4.2	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B28	SRG	0.006	61.3	16.8	7.559E-07	15	4.2							

IH-45	B	B28	SRG	0.003	62.2	15.9	7.559E-07	15	4.2	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B28	SRG	0.007	70.2	7.9	7.559E-07	15	4.2	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B28	SRG	0.0035	65.7	12.4	7.559E-07	15	4.2	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B26	SRG	0.015	56.4	21.71	7.559E-07	15	.	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	B2	SRG	0.023	56.4	21.71	1.043E-06	15	3	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	N1	SRG	0.005	56.4	21.71	0	15	4.4	0.0000066	4	0.65	0.75	465	5500000	28
IH-45	B	B27	SRG	0.012	56.4	21.71	7.559E-07	15	5.5	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	B	N2	SRG	0.001	56.4	21.71	0	15	3.4	0.0000066	4	0.65	0.75	465	5500000	28
IH-45	B	B4	SRG	0.014	56.4	21.71	1.043E-06	15	5	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	N3	SRG	0.004	56.4	21.71	0	15	4	0.0000066	4	0.65	0.75	465	5500000	28
IH-45	B	B6	SRG	0.018	56.4	21.71	1.043E-06	15	8	0.0000066	4	0.65	0.75	404	5395000	6
IH-45	B	N4	SRG	0.002	56.4	21.71	0	15	3	0.0000066	4	0.65	0.75	465	5500000	28
IH-45	B	B28	SRG	0.012	56.4	21.71	7.559E-07	15	4.2	0.0000066	4	0.65	0.75	455	5485000	12
IH-45	C	C2	SRG	0.015	58.2	15.5	1.043E-06	15	7.2	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C2	SRG	0.01	61.3	12.4	1.043E-06	15	7.2	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C2	SRG	0.007	62.2	11.5	1.043E-06	15	7.2	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C2	SRG	0.0075	70.2	3.5	1.043E-06	15	7.2	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C2	SRG	0.0065	65.7	8	1.043E-06	15	7.2	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C22	SRG	0.011	58.2	15.5	7.559E-07	15	2.8	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C22	SRG	0.006	61.3	12.4	7.559E-07	15	2.8	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C22	SRG	0.006	62.2	11.5	7.559E-07	15	2.8	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C22	SRG	0.005	70.2	3.5	7.559E-07	15	2.8	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C22	SRG	0.0045	65.7	8	7.559E-07	15	2.8	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C3	SRG	0.016	58.2	15.5	1.043E-06	15	7.1	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C3	SRG	0.011	61.3	12.4	1.043E-06	15	7.1	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C3	SRG	0.008	62.2	11.5	1.043E-06	15	7.1	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C3	SRG	0.006	70.2	3.5	1.043E-06	15	7.1	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C3	SRG	0.0065	65.7	8	1.043E-06	15	7.1	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C23	SRG	0.01	58.2	15.5	7.559E-07	15	3.5	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C23	SRG	0.009	61.3	12.4	7.559E-07	15	3.5	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C23	SRG	0.006	62.2	11.5	7.559E-07	15	3.5	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C23	SRG	0.0035	70.2	3.5	7.559E-07	15	3.5	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C23	SRG	0.0045	65.7	8	7.559E-07	15	3.5	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C5	SRG	0.011	58.2	15.5	1.043E-06	15	6.8	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C5	SRG	0.006	61.3	12.4	1.043E-06	15	6.8	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C5	SRG	0.007	62.2	11.5	1.043E-06	15	6.8	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C5	SRG	0.007	70.2	3.5	1.043E-06	15	6.8	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C5	SRG	0.004	65.7	8	1.043E-06	15	6.8	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C24	SRG	0.011	58.2	15.5	7.559E-07	15	14	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C24	SRG	0.008	61.3	12.4	7.559E-07	15	14	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C24	SRG	0.006	62.2	11.5	7.559E-07	15	14	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C24	SRG	0.004	70.2	3.5	7.559E-07	15	14	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	C24	SRG	0.006	65.7	8	7.559E-07	15	14	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	N1	SRG	0.005	56.4	17.31	0	15	4.3	0.0000066	4	0.55	0.75	465	5500000	28
IH-45	C	C2	SRG	0.015	56.4	17.31	1.043E-06	15	7.2	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	C22	SRG	0.014	56.4	17.31	7.559E-07	15	28	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	N2	SRG	0.007	56.4	17.31	0	15	4.8	0.0000066	4	0.55	0.75	465	5500000	28
IH-45	C	C3	SRG	0.013	56.4	17.31	1.043E-06	15	7.1	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	C	N3	SRG	0.003	56.4	17.31	0	15	2.9	0.0000066	4	0.55	0.75	465	5500000	28
IH-45	C	C23	SRG	0.017	56.4	17.31	7.559E-07	15	3.5	0.0000066	4	0.55	0.75	455	5485000	12
IH-45	C	N4	SRG	0.008	56.4	17.31	0	15	5.4	0.0000066	4	0.55	0.75	465	5500000	28
IH-45	C	C5	SRG	0.016	56.4	17.31	1.043E-06	15	4.3	0.0000066	4	0.55	0.75	404	5395000	6
IH-45	D	D2	SRG	0.011	58.2	15.5	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D2	SRG	0.008	61.3	12.4	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D2	SRG	0.006	62.2	11.5	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D2	SRG	0.0055	70.2	3.5	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D2	SRG	0.0045	65.7	8	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D4	SRG	0.011	58.2	15.5	1.043E-06	15	2.8	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D4	SRG	0.009	61.3	12.4	1.043E-06	15	2.8	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D4	SRG	0.008	62.2	11.5	1.043E-06	15	2.8	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D4	SRG	0.006	70.2	3.5	1.043E-06	15	2.8	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D31	SRG	0.007	58.2	15.5	7.559E-07	15	3.9	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D31	SRG	0.005	61.3	12.4	7.559E-07	15	3.9	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D31	SRG	0.004	62.2	11.5	7.559E-07	15	3.9	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D31	SRG	0.0045	70.2	3.5	7.559E-07	15	3.9	0.0000066	4	0.67	0.88	455	5485000	12

IH-45	D	D31	SRG	0.0045	65.7	8	7.559E-07	15	3.9	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D32	SRG	0.009	58.2	15.5	7.559E-07	15	8.4	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D32	SRG	0.006	61.3	12.4	7.559E-07	15	8.4	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D32	SRG	0.004	62.2	11.5	7.559E-07	15	8.4	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D32	SRG	0.0035	70.2	3.5	7.559E-07	15	8.4	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D32	SRG	0.0035	65.7	8	7.559E-07	15	8.4	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D7	SRG	0.011	58.2	15.5	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D7	SRG	0.008	61.3	12.4	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D7	SRG	0.005	62.2	11.5	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D7	SRG	0.0055	70.2	3.5	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D7	SRG	0.006	65.7	8	1.043E-06	15	6.5	0.0000066	4	0.67	0.88	404	5395000	6
IH-45	D	D33	SRG	0.007	58.2	15.5	7.559E-07	15	2.3	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D33	SRG	0.006	61.3	12.4	7.559E-07	15	2.3	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D33	SRG	0.005	62.2	11.5	7.559E-07	15	2.3	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D33	SRG	0.004	70.2	3.5	7.559E-07	15	2.3	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	D	D33	SRG	0.003	65.7	8	7.559E-07	15	2.3	0.0000066	4	0.67	0.88	455	5485000	12
IH-45	E	E1	LS	0.003	58.2	17	7.246E-07	15	.	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E1	LS	0.002	61.3	13.9	7.246E-07	15	.	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E1	LS	0.002	62.2	13	7.246E-07	15	.	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E1	LS	0.001	70.2	5	7.246E-07	15	.	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E1	LS	0.0015	65.7	9.5	7.246E-07	15	.	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E4	LS	0.005	58.2	17	6.94E-07	15	16	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E4	LS	0.003	61.3	13.9	6.94E-07	15	16	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E4	LS	0.003	62.2	13	6.94E-07	15	16	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E5	LS	0.005	61.3	13.9	6.94E-07	15	19	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E5	LS	0.0025	62.2	13	6.94E-07	15	19	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E5	LS	0.002	70.2	5	6.94E-07	15	19	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E5	LS	0.001	65.7	9.5	6.94E-07	15	19	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E2	LS	0.006	61.3	13.9	7.246E-07	15	13	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E2	LS	0.004	62.2	13	7.246E-07	15	13	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E2	LS	0.0025	70.2	5	7.246E-07	15	13	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E2	LS	0.002	58.2	17	7.246E-07	15	13	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E6	LS	0.007	61.3	13.9	6.94E-07	15	5.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E6	LS	0.005	62.2	13	6.94E-07	15	5.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E6	LS	0.0025	70.2	5	6.94E-07	15	5.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E6	LS	0.002	65.7	9.5	6.94E-07	15	5.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E6	LS	0.0035	58.2	17	6.94E-07	15	5.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E7	LS	0.008	61.3	13.9	6.94E-07	15	6.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E7	LS	0.0035	62.2	13	6.94E-07	15	6.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E7	LS	0.0025	70.2	5	6.94E-07	15	6.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E7	LS	0.0025	65.7	9.5	6.94E-07	15	6.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E7	LS	0.003	58.2	17	6.94E-07	15	6.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	E1	LS	0.01	66.3	8.91	7.246E-07	15	.	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	N1	LS	0.002	66.3	8.91	0	15	2.5	0.0000041	4	0.75	0.88	572	5010000	28
IH-45	E	E4	LS	0.014	66.3	8.91	6.94E-07	15	5.4	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	N2	LS	0.002	66.3	8.91	0	15	3	0.0000041	4	0.75	0.88	572	5010000	28
IH-45	E	E5	LS	0.01	66.3	8.91	6.94E-07	15	4.2	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	E	N3	LS	0.001	66.3	8.91	0	15	7.1	0.0000041	4	0.75	0.88	572	5010000	28
IH-45	E	E2	LS	0.01	66.3	8.91	7.246E-07	15	8.7	0.0000041	4	0.75	0.88	429	4700000	4
IH-45	E	E6	LS	0.009	66.3	8.91	6.94E-07	15	5.1	0.0000041	4	0.75	0.88	454	4840000	5
IH-45	F	F1	LS	0.008	58.2	17	7.246E-07	15	12	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F1	LS	0.005	61.3	13.9	7.246E-07	15	12	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F1	LS	0.003	62.2	13	7.246E-07	15	12	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F1	LS	0.0045	70.2	5	7.246E-07	15	12	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F1	LS	0.0035	65.7	9.5	7.246E-07	15	12	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F5	LS	0.008	58.2	17	6.94E-07	15	18	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F5	LS	0.004	61.3	13.9	6.94E-07	15	18	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F5	LS	0.0035	62.2	13	6.94E-07	15	18	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F5	LS	0.003	70.2	5	6.94E-07	15	18	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F5	LS	0.0035	65.7	9.5	6.94E-07	15	18	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F2	LS	0.008	58.2	17	7.246E-07	15	13	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F2	LS	0.004	61.3	13.9	7.246E-07	15	13	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F2	LS	0.0035	62.2	13	7.246E-07	15	13	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F2	LS	0.0035	70.2	5	7.246E-07	15	13	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F2	LS	0.004	65.7	9.5	7.246E-07	15	13	0.0000041	4	0.63	0.75	429	4700000	4

IH-45	F	F6	LS	0.006	58.2	17	6.94E-07	15	8.4	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F6	LS	0.004	61.3	13.9	6.94E-07	15	8.4	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F6	LS	0.0025	62.2	13	6.94E-07	15	8.4	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F6	LS	0.002	70.2	5	6.94E-07	15	8.4	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F6	LS	0.003	65.7	9.5	6.94E-07	15	8.4	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	N1	LS	0.001	66.3	8.91	0	15	3.1	0.0000041	4	0.63	0.75	572	5010000	28
IH-45	F	N2	LS	0.001	66.3	8.91	0	15	3.8	0.0000041	4	0.63	0.75	572	5010000	28
IH-45	F	F1	LS	0.012	66.3	8.91	7.246E-07	15	8.7	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F5	LS	0.011	66.3	8.91	6.94E-07	15	6.7	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	F2	LS	0.015	66.3	8.91	7.246E-07	15	6.3	0.0000041	4	0.63	0.75	429	4700000	4
IH-45	F	F6	LS	0.007	66.3	8.91	6.94E-07	15	4.8	0.0000041	4	0.63	0.75	454	4840000	5
IH-45	F	N3	LS	0.003	66.3	8.91	0	15	5.6	0.0000041	4	0.63	0.75	572	5010000	28
IH-45	G	G10	LS	0.002	58.2	11.1	6.94E-07	15	15	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G10	LS	0.002	61.3	8	6.94E-07	15	15	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G10	LS	0.0015	62.2	7.1	6.94E-07	15	15	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G10	LS	0.0025	70.2	-0.9	6.94E-07	15	15	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G10	LS	0.0015	65.7	3.6	6.94E-07	15	15	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G2	LS	0.005	58.2	11.1	7.246E-07	15	10	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G2	LS	0.002	61.3	8	7.246E-07	15	10	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G2	LS	0.0015	62.2	7.1	7.246E-07	15	10	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G2	LS	0.002	70.2	-0.9	7.246E-07	15	10	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G11	LS	0.003	58.2	11.1	6.94E-07	15	9.4	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G11	LS	0.0025	61.3	8	6.94E-07	15	9.4	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G11	LS	0.0015	62.2	7.1	6.94E-07	15	9.4	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G11	LS	0.002	70.2	-0.9	6.94E-07	15	9.4	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G1	LS	0.005	58.2	11.1	7.246E-07	15	15	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G1	LS	0.003	61.3	8	7.246E-07	15	15	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G1	LS	0.0025	62.2	7.1	7.246E-07	15	15	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G1	LS	0.0015	70.2	-0.9	7.246E-07	15	15	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G1	LS	0.0015	65.7	3.6	7.246E-07	15	15	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G14	LS	0.002	58.2	11.1	6.94E-07	15	16	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G14	LS	0.001	61.3	8	6.94E-07	15	16	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G14	LS	0.015	62.2	7.1	6.94E-07	15	16	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G14	LS	0.0025	70.2	-0.9	6.94E-07	15	16	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G5	LS	0.003	58.2	11.1	7.246E-07	15	12	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G5	LS	0.001	61.3	8	7.246E-07	15	12	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G5	LS	0.002	62.2	7.1	7.246E-07	15	12	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G5	LS	0.0025	70.2	-0.9	7.246E-07	15	12	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G5	LS	0.002	65.7	3.6	7.246E-07	15	12	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	N1	LS	0.003	65.7	3.6	0	15	4.2	0.0000041	4	0.74	0.75	572	5010000	28
IH-45	G	G10	LS	0.003	65.7	3.6	6.94E-07	15	7.3	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G2	LS	0.004	65.7	3.6	7.246E-07	15	4.8	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	G11	LS	0.003	65.7	3.6	6.94E-07	15	4.1	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G1	LS	0.01	65.7	3.6	7.246E-07	15	5.6	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	N2	LS	0.002	65.7	3.6	0	15	3	0.0000041	4	0.74	0.75	572	5010000	28
IH-45	G	G14	LS	0.007	65.7	3.6	6.94E-07	15	8	0.0000041	4	0.74	0.75	454	4840000	5
IH-45	G	G5	LS	0.009	65.7	3.6	7.246E-07	15	7.6	0.0000041	4	0.74	0.75	429	4700000	4
IH-45	G	N3	LS	0.001	65.7	3.6	0	15	3.2	0.0000041	4	0.74	0.75	572	5010000	28
IH-45	H	H10	LS	0.003	58.2	11.1	6.94E-07	15	.	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H10	LS	0.003	61.3	8	6.94E-07	15	.	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H10	LS	0.002	62.2	7.1	6.94E-07	15	.	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H3	LS	0.005	58.2	11.1	7.246E-07	15	9.3	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H3	LS	0.003	61.3	8	7.246E-07	15	9.3	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H3	LS	0.003	62.2	7.1	7.246E-07	15	9.3	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H12	LS	0.005	58.2	11.1	6.94E-07	15	12	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H12	LS	0.003	61.3	8	6.94E-07	15	12	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H12	LS	0.002	62.2	7.1	6.94E-07	15	12	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H12	LS	0.001	70.2	-0.9	6.94E-07	15	12	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H7	LS	0.006	58.2	11.1	7.246E-07	15	6.8	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H7	LS	0.005	61.3	8	7.246E-07	15	6.8	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H7	LS	0.004	62.2	7.1	7.246E-07	15	6.8	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H7	LS	0.003	70.2	-0.9	7.246E-07	15	6.8	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H7	LS	0.0035	65.7	3.6	7.246E-07	15	6.8	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H8	LS	0.004	58.2	11.1	7.246E-07	15	12	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H8	LS	0.0015	61.3	8	7.246E-07	15	12	0.0000041	4	0.84	0.75	429	4700000	4

IH-45	H	H8	LS	0.001	62.2	7.1	7.246E-07	15	12	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H8	LS	0.002	70.2	-0.9	7.246E-07	15	12	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H8	LS	0.002	65.7	3.6	7.246E-07	15	12	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H13	LS	0.004	58.2	11.1	6.94E-07	15	14	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H13	LS	0.002	61.3	8	6.94E-07	15	14	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H13	LS	0.0015	62.2	7.1	6.94E-07	15	14	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H13	LS	0.002	70.2	-0.9	6.94E-07	15	14	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H13	LS	0.0015	65.7	3.6	6.94E-07	15	14	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H10	LS	0.005	78.8	-9.47	6.94E-07	15	.	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	N1	LS	0.011	78.8	-9.47	0	15	2.6	0.0000041	4	0.84	0.75	572	5010000	28
IH-45	H	H3	LS	0.008	78.8	-9.47	7.246E-07	15	6.6	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H12	LS	0.008	78.8	-9.47	6.94E-07	15	5	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	H7	LS	0.009	78.8	-9.47	7.246E-07	15	2.6	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	H8	LS	0.003	78.8	-9.47	7.246E-07	15	7.4	0.0000041	4	0.84	0.75	429	4700000	4
IH-45	H	N2	LS	0.002	78.8	-9.47	0	15	7.1	0.0000041	4	0.84	0.75	572	5010000	28
IH-45	H	H13	LS	0.01	78.8	-9.47	6.94E-07	15	9.9	0.0000041	4	0.84	0.75	454	4840000	5
IH-45	H	N3	LS	0.001	78.8	-9.47	0	15	6	0.0000041	4	0.84	0.75	572	5010000	28

APPENDIX L. NEW CRACK WIDTH MODEL COMPARISON

This appendix presents comparison plots of the average measured crack width and the new proposed crack width model for the CRCP-7 computer program. The crack width values are in inches.