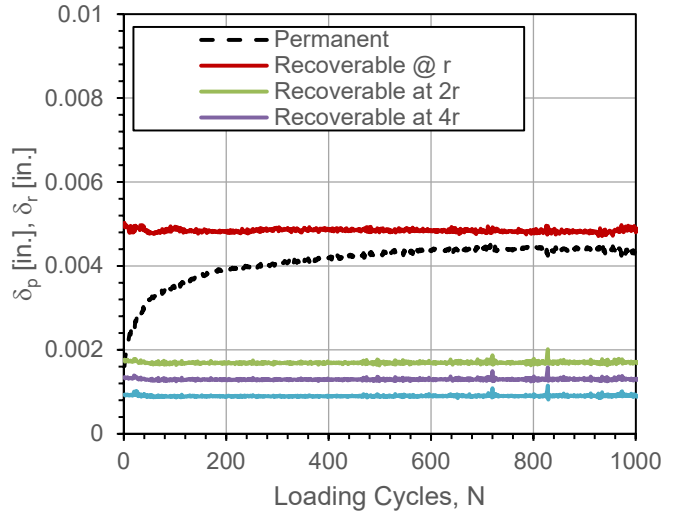
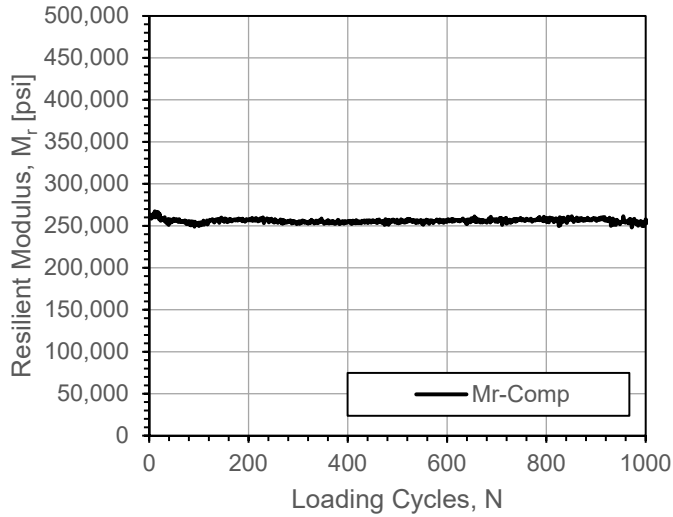


# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	10:52:47 AM	Test ID	PT1_White GT
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1156+50
Latitude,N:	42.49755500	Longitude,W:	-91.91380167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. White geotextile interlayer between the PCC overlay and the underlying existing ACC.				



$\sigma_{cyclic} =$  92.1 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0019

$d =$  0.1263

$R^2 =$  0.934

$N^* =$  540 Cycles

$\delta_p \text{ at } N^* =$  0.0043 in.

Adj.  $\delta_p \text{ at } N^* =$  0.0023 in.

$$\delta_p = CN^d$$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

$$\text{Adj. } \delta_p \text{ at } N^* = \delta_p \text{ at } N^* - C$$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of x in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  254,648 psi

Max.  $\delta_p =$  0.005 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	10:52:47 AM	Test ID	PT1_White GT
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1156+50
Latitude,N:	42.49755500	Longitude,W:	-91.91380167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. White geotextile interlayer between the PCC overlay and the underlying existing ACC.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	$L_{est}$ (in.)	$L_{adj}$ (in.)	$k_{static}$ (psi/in)	* $k_{static-corr}$ (psi/in)	$E_{PCC}$ (psi)
1	96	18.4	26.1	25.3	198.9	228.3	5,111,239
10	95	18.4	26.0	25.2	203.5	233.2	5,140,869
100	91	18.3	25.7	25.0	194.6	222.2	4,747,458
1000*	92	18.4	26.1	25.4	192.0	220.4	4,943,820

\*average of 950-1000 cycles

$k_{static} = 1/2$  of  $k_{dynamic}$  value

### Structural Design Parameters - 18-kip ESWL

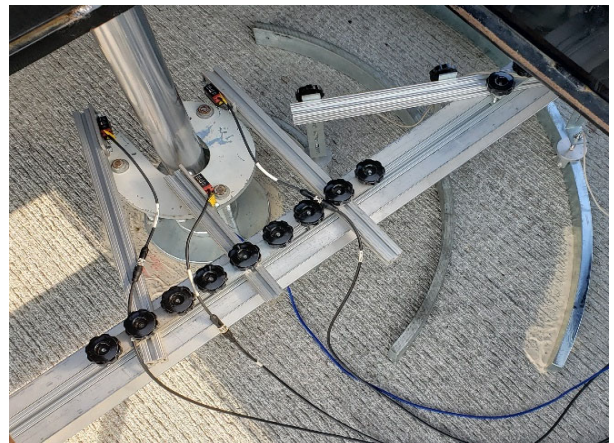
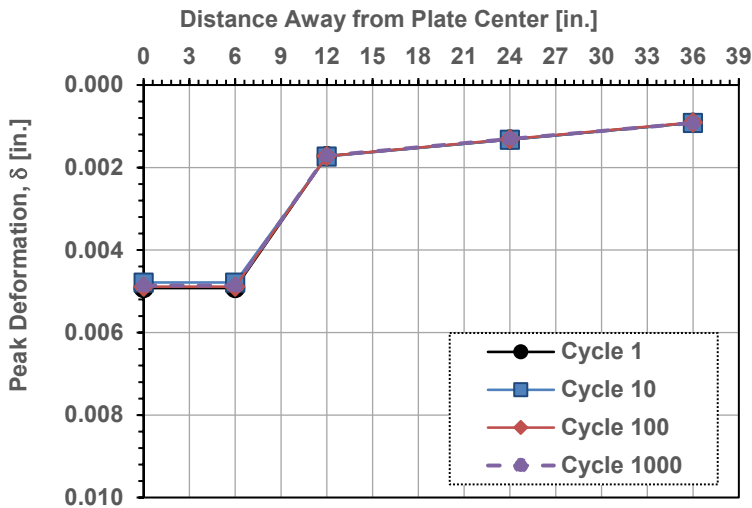
$$k\text{-value} = \boxed{220} \text{ psi/in}$$

$$E_{PCC} = \boxed{4,943,820} \text{ psi}$$

Note: k-value and  $E_{PCC}$  at 1000 cycles

\* $k_{corr}$  = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

$k_{static}$  = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



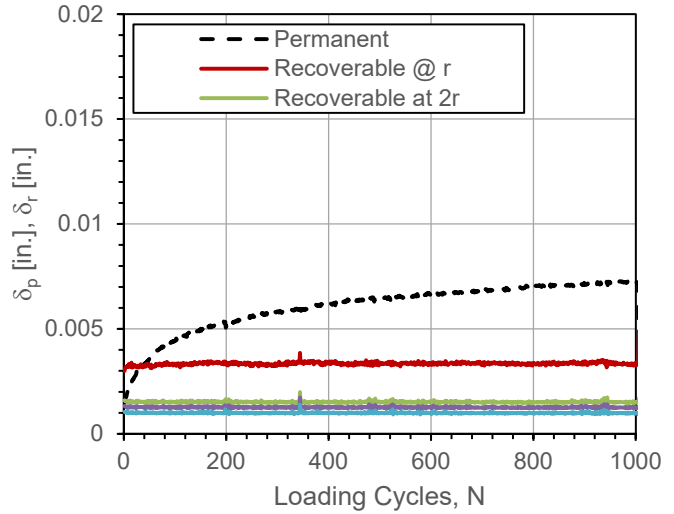
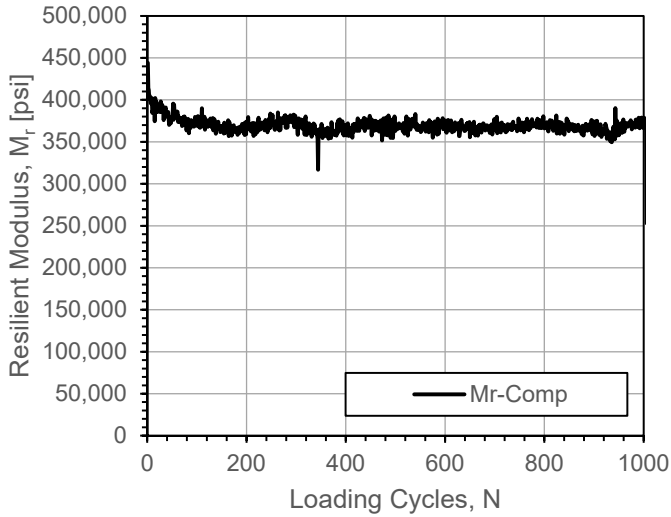
### In-situ Test Results: k-value and $E_{PCC}$

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	12:00:54 PM	Test ID	PT2_White GT
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1155+50
Latitude,N:	42.49757000	Longitude,W:	-91.91416833	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. White geotextile interlayer between the PCC overlay and the underlying existing ACC.				



$\sigma_{cyclic} =$  91.8 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0014

$d =$  0.2392

$R^2 =$  0.978

$N^* =$  2,164 Cycles

$\delta_p$  at  $N^* =$  0.0090 in.

Adj.  $\delta_p$  at  $N^* =$  0.0076 in.

Model:  $\delta_p = CN^d$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

Adj.  $\delta_p$  at  $N^* = \delta_p$  at  $N^* - C$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  370,094 psi

Max.  $\delta_p =$  0.007 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	12:00:54 PM	Test ID	PT2_White GT
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1155+50
Latitude,N:	42.49757000	Longitude,W:	-91.91416833	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. White geotextile interlayer between the PCC overlay and the underlying existing ACC.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	$L_{est}$ (in.)	$L_{adj}$ (in.)	$k_{static}$ (psi/in)	* $k_{static-corr}$ (psi/in)	$E_{PCC}$ (psi)
1	96	20.0	34.6	32.2	179.7	238.9	13,947,553
10	96	19.9	33.9	31.7	174.3	228.9	12,606,382
100	92	19.9	33.5	31.4	172.6	225.0	11,931,171
1000*	92	19.9	33.8	31.7	167.3	219.3	11,974,417

\*average of 950-1000 cycles

$k_{static} = 1/2$  of  $k_{dynamic}$  value

### Structural Design Parameters - 18-kip ESWL

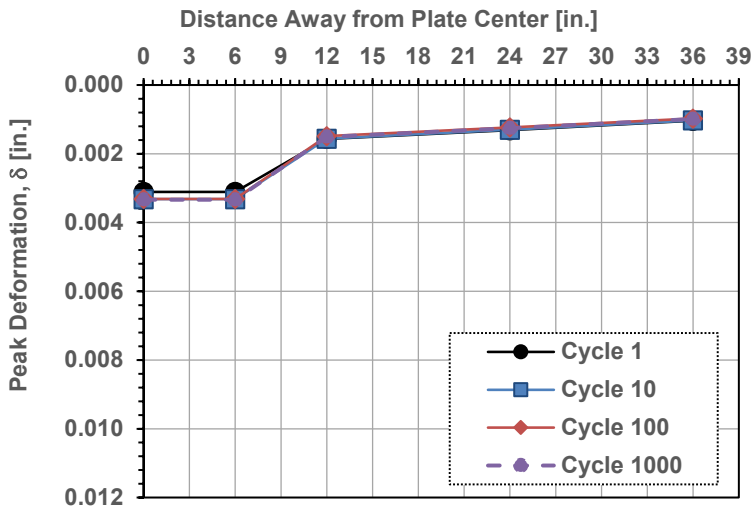
$$k\text{-value} = \boxed{219} \text{ psi/in}$$

$$E_{PCC} = \boxed{11,974,417} \text{ psi}$$

Note: k-value and  $E_{PCC}$  at 1000 cycles

\* $k_{corr}$  = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

$k_{static}$  = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



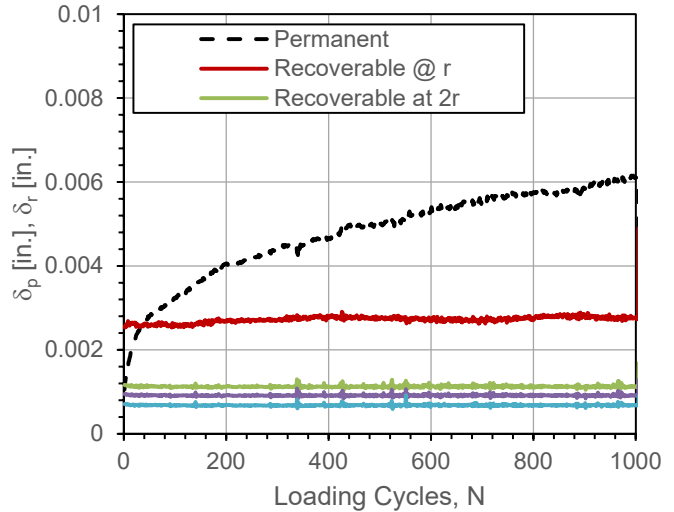
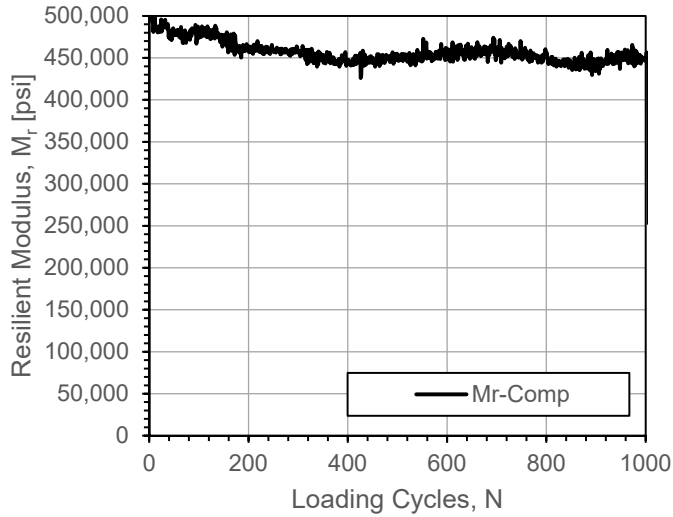
### In-situ Test Results: k-value and $E_{PCC}$

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	12:58:42 PM	Test ID	PT3_Control
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1154+00
Latitude,N:	42.49754667	Longitude,W:	-91.91477833	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Control section - no geotextile at the interface.				



$\sigma_{cyclic} =$  92.5 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0010

$d =$  0.2653

$R^2 =$  0.995

$N^* =$  1,907 Cycles

$\delta_p \text{ at } N^* =$  0.0072 in.

Adj.  $\delta_p \text{ at } N^* =$  0.0062 in.

$$\text{Model: } \delta_p = CN^d$$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

Adj.  $\delta_p \text{ at } N^* = \delta_p \text{ at } N^* - C$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  450,161 psi

Max.  $\delta_p =$  0.006 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	12:58:42 PM	Test ID	PT3_Control
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1154+00
Latitude,N:	42.49754667	Longitude,W:	-91.91477833	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Control section - no geotextile at the interface.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	$L_{est}$ (in.)	$L_{adj}$ (in.)	$k_{static}$ (psi/in)	* $k_{static-corr}$ (psi/in)	$E_{PCC}$ (psi)
1	95	19.4	30.8	29.3	274.1	340.0	13,606,902
10	96	19.4	30.8	29.3	271.6	336.7	13,418,005
100	92	19.4	30.9	29.3	260.6	323.5	13,027,251
1000*	92	19.4	30.6	29.1	248.5	307.0	11,973,534

\*average of 950-1000 cycles

$k_{static} = 1/2$  of  $k_{dynamic}$  value

### Structural Design Parameters - 18-kip ESWL

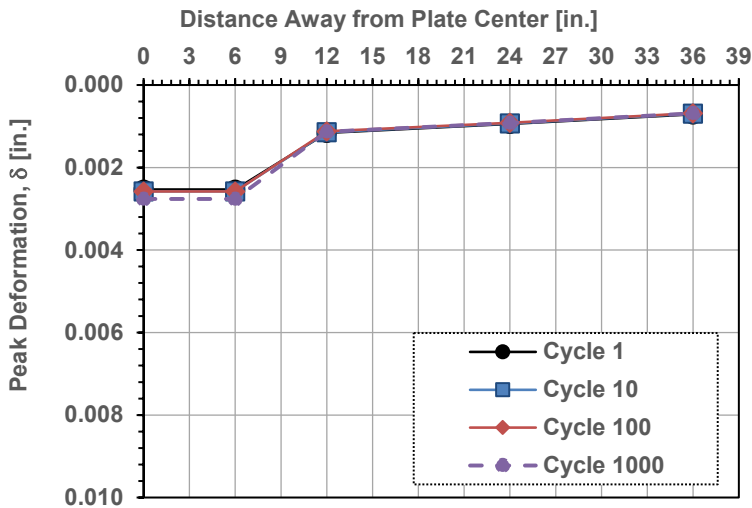
$k_{value} =$  307 psi/in

Note: k-value and  $E_{PCC}$  at 1000 cycles

$E_{PCC} =$  11,973,534 psi

\* $k_{corr}$  = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

$k_{static}$  = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



### In-situ Test Results: k-value and $E_{PCC}$

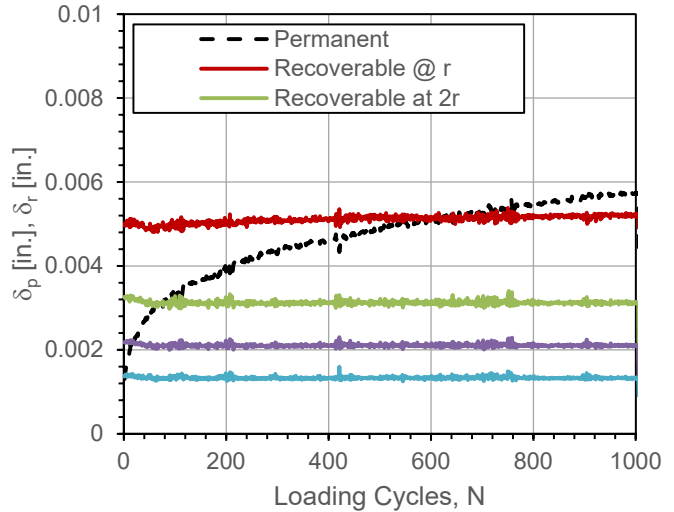
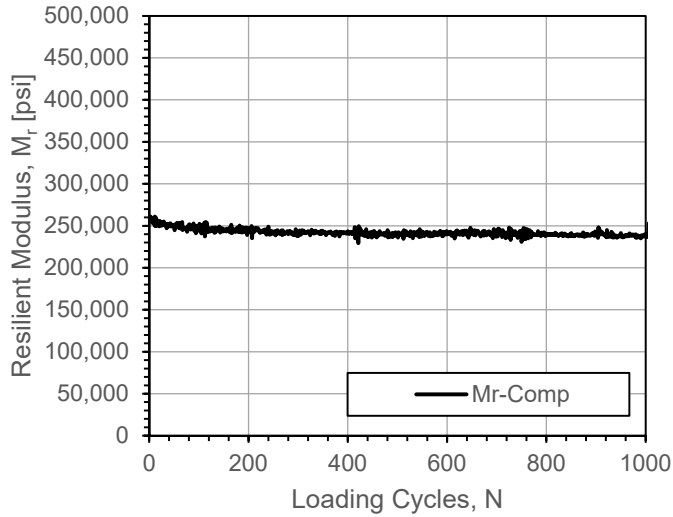
Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA





# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	2:05:25 PM	Test ID	PT4_Control
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1140+47
Latitude,N:	42.49750167	Longitude,W:	-91.91980000	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Control section - no geotextile at the interface.				



$\sigma_{cyclic} =$  92.4 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0011

$d =$  0.2378

$R^2 =$  0.996

$N^* =$  1,512 Cycles

$\delta_p$  at  $N^* =$  0.0064 in.

Adj.  $\delta_p$  at  $N^* =$  0.0052 in.

Model:  $\delta_p = CN^d$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

Adj.  $\delta_p$  at  $N^* = \delta_p$  at  $N^* - C$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  238,208 psi

Max.  $\delta_p =$  0.006 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	2:05:25 PM	Test ID	PT4_Control
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1140+47
Latitude,N:	42.49750167	Longitude,W:	-91.91980000	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Control section - no geotextile at the interface.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	L <sub>est</sub> (in.)	L <sub>adj</sub> (in.)	k <sub>static</sub> (psi/in)	*k <sub>static-corr</sub> (psi/in)	E <sub>PCC</sub> (psi)
1	96	16.6	20.6	20.4	308.9	330.2	3,091,956
10	96	16.9	21.3	21.1	291.9	314.7	3,362,881
100	92	16.7	20.7	20.5	298.8	319.9	3,063,916
1000*	92	16.7	20.6	20.4	283.9	303.7	2,868,326

\*average of 950-1000 cycles

k<sub>static</sub> = 1/2 of k<sub>dynamic</sub> value

### Structural Design Parameters - 18-kip ESWL

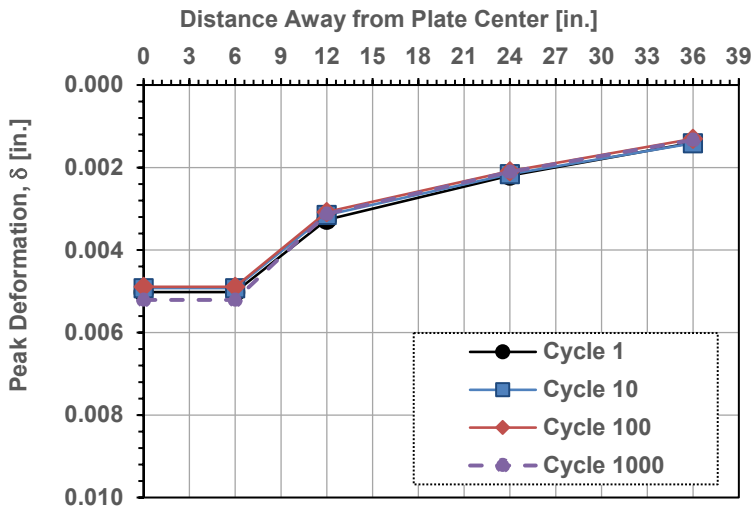
k-value = 304 psi/in

Note: k-value and E<sub>PCC</sub> at 1000 cycles

E<sub>PCC</sub> = 2,868,326 psi

\*k<sub>corr</sub> = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

k<sub>static</sub> = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



### In-situ Test Results: k-value and E<sub>PCC</sub>

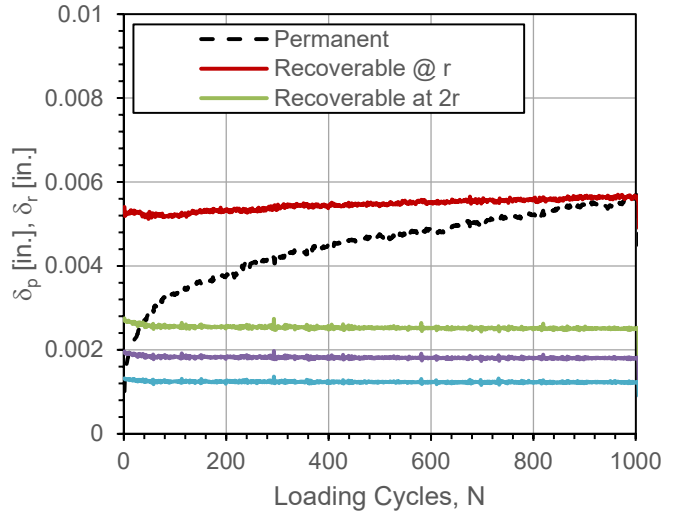
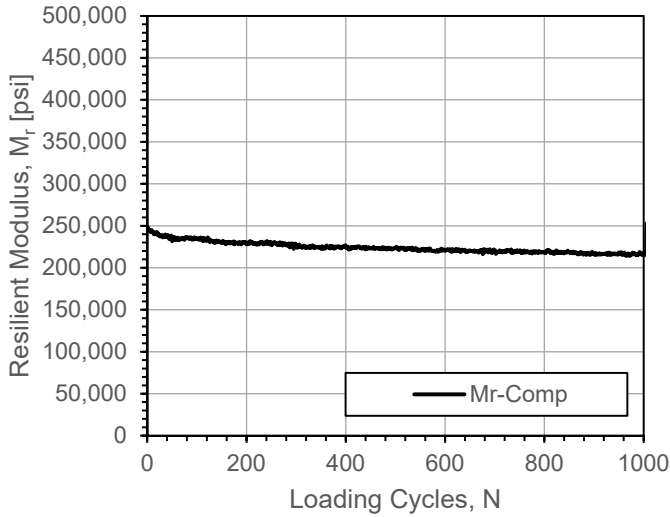
Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA





# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	3:16:36 PM	Test ID	<b>PT5_Std. Black</b>
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1162+00
Latitude,N:	42.49758667	Longitude,W:	-91.91175167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Standard Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				



$\sigma_{cyclic} =$  90.9 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0012

$d =$  0.2236

$R^2 =$  0.995

$N^* =$  1,305 Cycles

$\delta_p$  at  $N^* =$  0.0058 in.

Adj.  $\delta_p$  at  $N^* =$  0.0047 in.

$$\delta_p = CN^d$$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

Adj.  $\delta_p$  at  $N^* = \delta_p$  at  $N^* - C$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  216,459 psi

Max.  $\delta_p =$  0.006 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	3:16:36 PM	Test ID	PT5_Std. Black
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1162+00
Latitude,N:	42.49758667	Longitude,W:	-91.91175167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Standard Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	$L_{est}$ (in.)	$L_{adj}$ (in.)	$k_{static}$ (psi/in)	* $k_{static-corr}$ (psi/in)	$E_{PCC}$ (psi)
1	95	17.5	23.0	22.6	237.3	260.9	3,682,132
10	95	17.5	22.8	22.5	237.2	260.3	3,595,474
100	91	17.6	23.2	22.8	222.6	245.4	3,582,050
1000*	91	17.6	23.2	22.8	205.2	226.2	3,316,745

\*average of 950-1000 cycles

$k_{static} = 1/2$  of  $k_{dynamic}$  value

### Structural Design Parameters - 18-kip ESWL

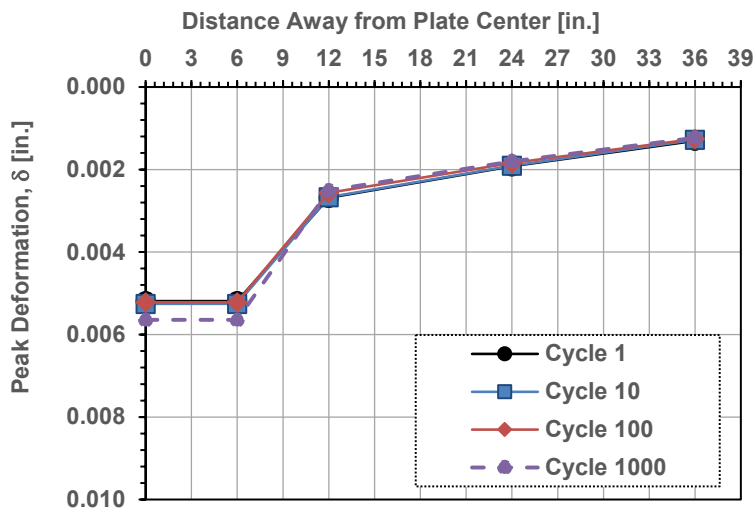
$$k\text{-value} = \boxed{226} \text{ psi/in}$$

Note: k-value and  $E_{PCC}$  at 1000 cycles

$$E_{PCC} = \boxed{3,316,745} \text{ psi}$$

\* $k_{corr}$  = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

$k_{static}$  = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



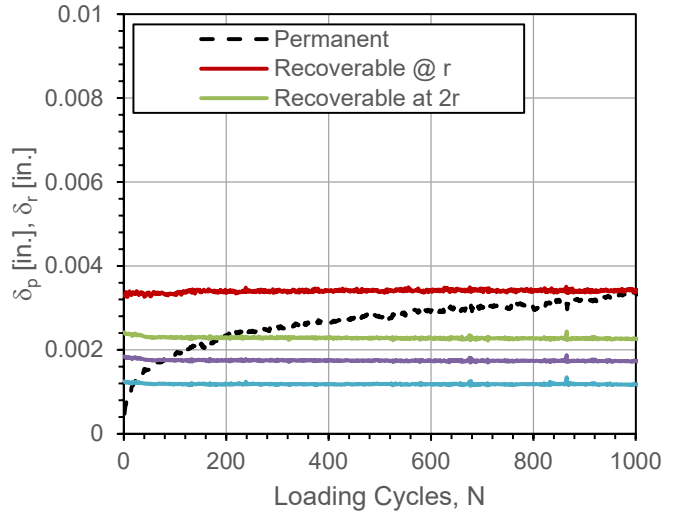
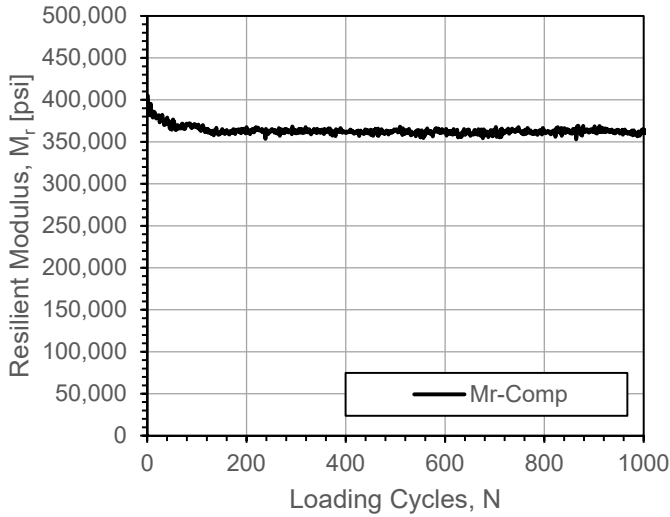
### In-situ Test Results: k-value and $E_{PCC}$

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	4:09:05 PM	Test ID	<b>PT6_Std. Black</b>
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1166+00
Latitude,N:	42.49762333	Longitude,W:	-91.91026167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Standard Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				



$\sigma_{cyclic} =$  91.9 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0006

$d =$  0.2512

$R^2 =$  0.987

$N^* =$  789 Cycles

$\delta_p$  at  $N^* =$  0.0031 in.

Adj.  $\delta_p$  at  $N^* =$  0.0026 in.

$$\text{Model: } \delta_p = CN^d$$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

Adj.  $\delta_p$  at  $N^* = \delta_p$  at  $N^* - C$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  361,284 psi

Max.  $\delta_p =$  0.003 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	4:09:05 PM	Test ID	PT6_Std. Black
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1166+00
Latitude,N:	42.49762333	Longitude,W:	-91.91026167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Standard Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	L <sub>est</sub> (in.)	L <sub>adj</sub> (in.)	k <sub>static</sub> (psi/in)	*k <sub>static-corr</sub> (psi/in)	E <sub>PCC</sub> (psi)
1	96	18.3	25.5	24.9	305.3	347.7	7,223,887
10	96	18.2	25.5	24.9	298.5	339.8	7,038,678
100	91	18.3	25.6	24.9	288.1	328.4	6,894,602
1000*	92	18.3	25.7	25.0	280.4	320.0	6,811,287

\*average of 950-1000 cycles

k<sub>static</sub> = 1/2 of k<sub>dynamic</sub> value

### Structural Design Parameters - 18-kip ESWL

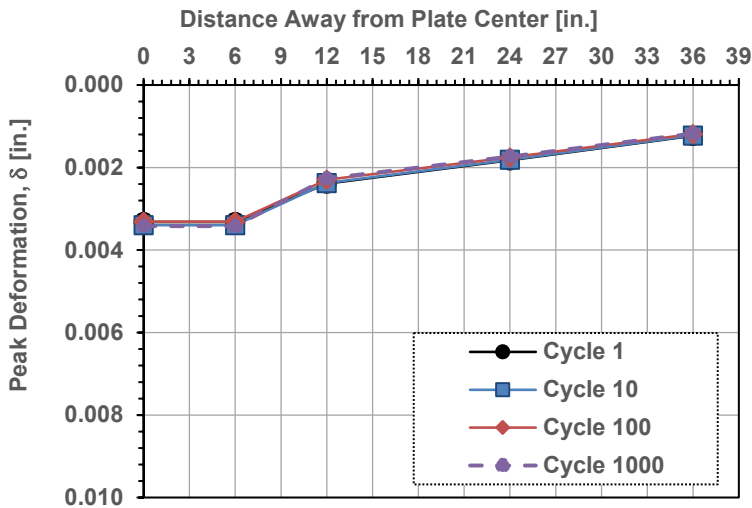
k-value = 320 psi/in

Note: k-value and E<sub>PCC</sub> at 1000 cycles

E<sub>PCC</sub> = 6,811,287 psi

\*k<sub>corr</sub> = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

k<sub>static</sub> = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



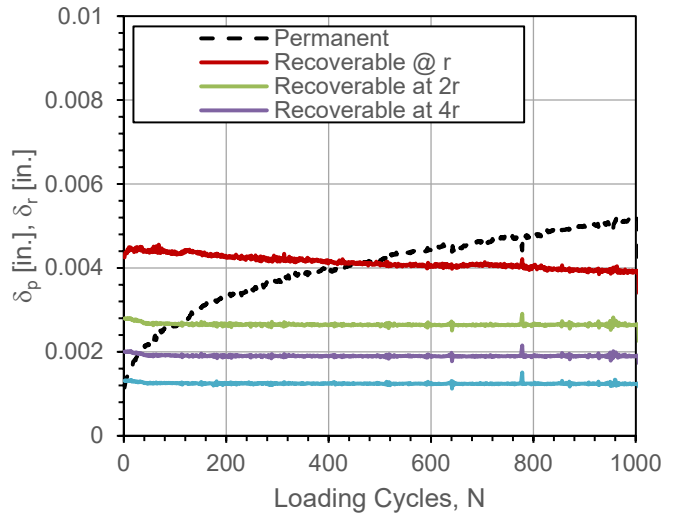
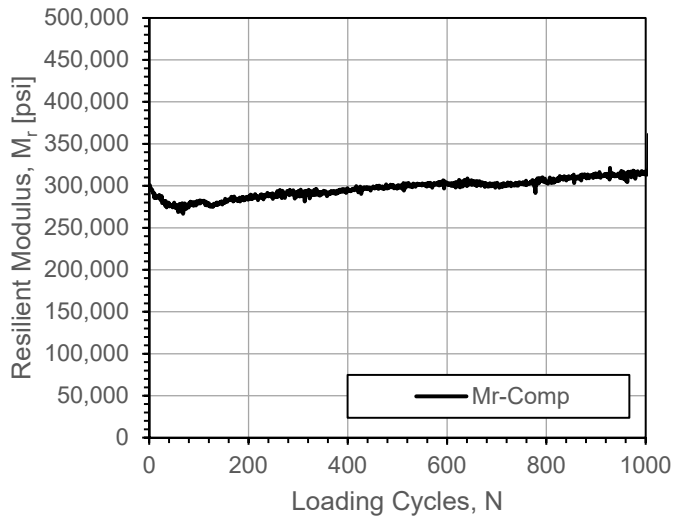
### In-situ Test Results: k-value and E<sub>PCC</sub>

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	5:10:28 PM	Test ID	<b>PT7_Thin Black</b>
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1174+00
Latitude,N:	42.49765167	Longitude,W:	-91.90729167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Thin Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				



$\sigma_{cyclic} =$  91.6 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0008

$d =$  0.2691

$R^2 =$  0.993

$N^* =$  1,534 Cycles

$\delta_p$  at  $N^* =$  0.0057 in.

Adj.  $\delta_p$  at  $N^* =$  0.0049 in.

$$\text{Model: } \delta_p = CN^d$$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

$$\text{Adj. } \delta_p \text{ at } N^* = \delta_p \text{ at } N^* - C$$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  313,723 psi

Max.  $\delta_p =$  0.005 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	5:10:28 PM	Test ID	PT7_Thin Black
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1174+00
Latitude,N:	42.49765167	Longitude,W:	-91.90729167	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Thin Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	$L_{est}$ (in.)	$L_{adj}$ (in.)	$k_{static}$ (psi/in)	* $k_{static-corr}$ (psi/in)	$E_{PCC}$ (psi)
1	96	17.4	22.8	22.4	292.9	321.4	4,410,243
10	95	17.4	22.8	22.4	285.6	313.2	4,277,389
100	91	17.4	22.8	22.4	275.8	302.7	4,166,311
1000*	92	17.4	22.8	22.4	307.9	337.8	4,633,788

\*average of 950-1000 cycles

$k_{static} = 1/2$  of  $k_{dynamic}$  value

### Structural Design Parameters - 18-kip ESWL

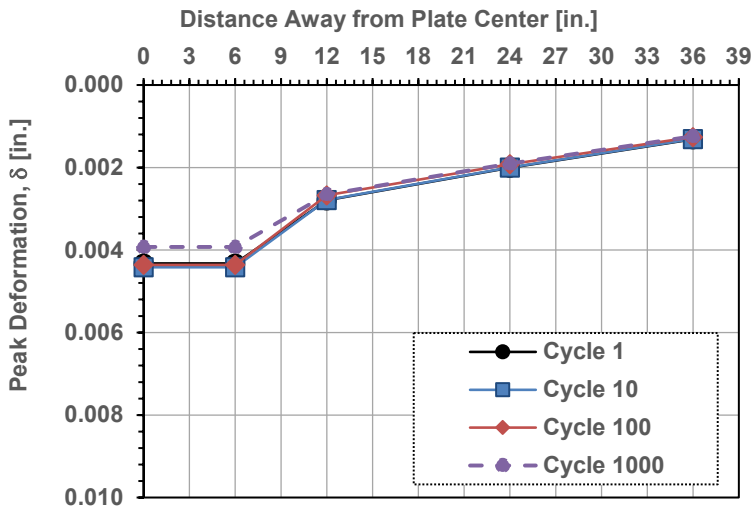
$$k\text{-value} = \boxed{338} \text{ psi/in}$$

$$E_{PCC} = \boxed{4,633,788} \text{ psi}$$

Note: k-value and  $E_{PCC}$  at 1000 cycles

\* $k_{corr}$  = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

$k_{static}$  = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



### In-situ Test Results: k-value and $E_{PCC}$

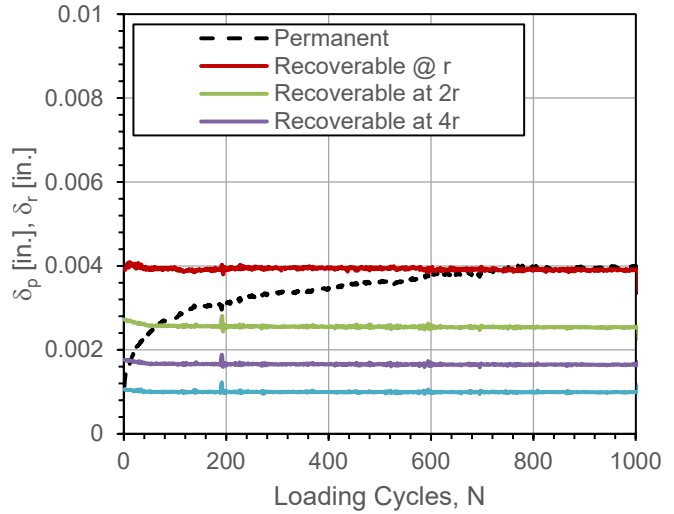
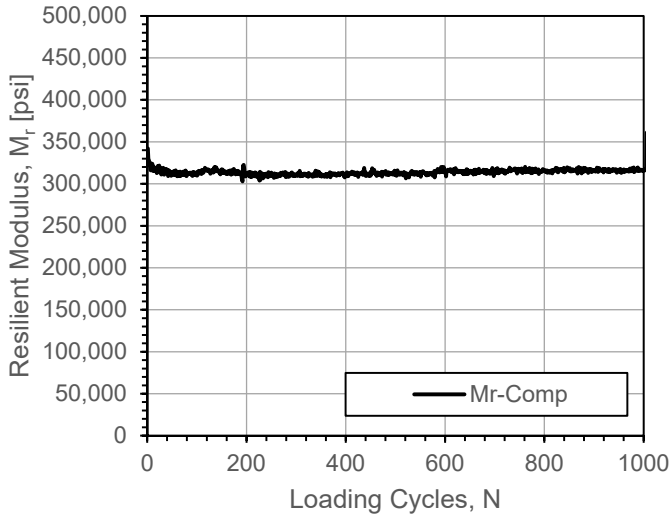
Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA





# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	6:03:46 PM	Test ID	PT8_Thin Black
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1176+00
Latitude,N:	42.49766000	Longitude,W:	-91.90654333	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Thin Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				



$\sigma_{cyclic} =$  91.9 psi

Plate Dia. = 12.0 in.

### Permanent Deformation Prediction Parameters

$C =$  0.0012

$d =$  0.1759

$R^2 =$  0.984

$N^* =$  672 Cycles

$\delta_p$  at  $N^* =$  0.0038 in.

Adj.  $\delta_p$  at  $N^* =$  0.0026 in.

$$\text{Model: } \delta_p = CN^d$$

$\delta_p$  = permanent deformation

$C$  = plastic deformation after first cycle

$d$  = scaling component

$N$  = Number of loading cycles

$N^*$  = Number of loading cycles at  $\Delta\delta_p = 1E-06$  in./cycle

Adj.  $\delta_p$  at  $N^* = \delta_p$  at  $N^* - C$

$N_x$  = Number of loading cycles to achieve  $\delta_p$  of  $x$  in.

### In-situ Composite Resilient Modulus [950-1000 cycles]

$M_{r-comp} =$  316,204 psi

Max.  $\delta_p =$  0.004 in.

### In-situ Test Results: Resilient Modulus and Deformations

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA



# Automated Plate Load Test [APLT]

Test:	In-situ Cyclic Plate Load Test: Single Stress, 12 in. diameter loading plate				
Date:	9/23/2020	Time:	6:03:46 PM	Test ID	PT8_Thin Black
Tested By	HG, CV	Location:	D16, WB Lane	Sta.	1176+00
Latitude,N:	42.49766000	Longitude,W:	-91.90654333	Elev. (ft):	NA
Comments:	Nominal 6 in. PCC overlay on nominal 12 in. ACC. Thin Black geotextile interlayer between the PCC overlay and the underlying existing ACC.				

Cycle	Stress, $\sigma$ (psi)	AREA, $A_3$ (in.)	$L_{est}$ (in.)	$L_{adj}$ (in.)	$k_{static}$ (psi/in)	* $k_{static-corr}$ (psi/in)	$E_{PCC}$ (psi)
1	96	16.1	19.4	19.2	444.3	469.3	3,492,633
10	96	16.1	19.4	19.2	424.7	448.6	3,338,062
100	91	16.1	19.3	19.2	419.8	443.2	3,264,156
1000*	92	16.1	19.4	19.3	423.4	447.4	3,364,502

\*average of 950-1000 cycles

$k_{static} = 1/2$  of  $k_{dynamic}$  value

### Structural Design Parameters - 18-kip ESWL

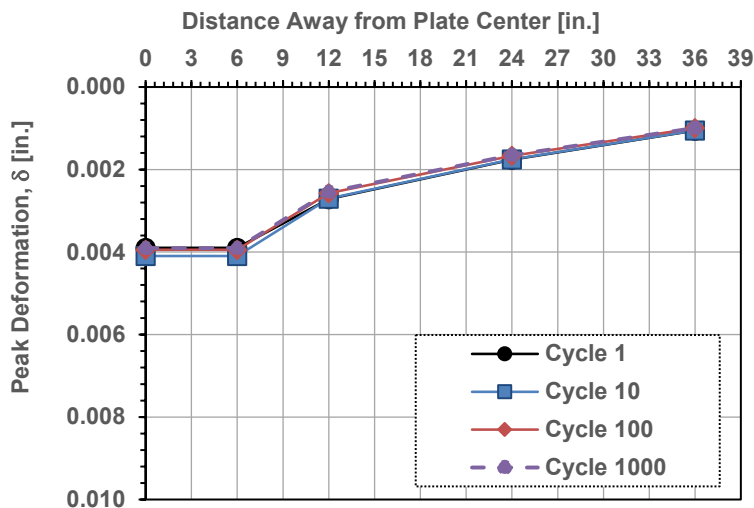
$$k\text{-value} = \boxed{447} \text{ psi/in}$$

Note: k-value and  $E_{PCC}$  at 1000 cycles

$$E_{PCC} = \boxed{3,364,502} \text{ psi}$$

\* $k_{corr}$  = Corrected k-values for finite slab size (assumed as 11.25 ft wide), per Croveti (1993)

$k_{static}$  = k-values determined from cyclic PLT are divided by an empirical factor of 2, per AASHTO (1993).



### In-situ Test Results: k-value and $E_{PCC}$

Project Name: Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers  
 Project ID: ISP\_00010  
 Location: D16, Buchanan County, IA

