Appendix F

Documentation of Pavement Responses
Sub Appendix F-1

Documentation of Pavement Responses for

18-kips Single Axle
Figures F-1-1 through F-1-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

**Figure F-1-1:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-1-2:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-1-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-1-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-1-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)

Figure F-1-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)
Figure F-1-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-1-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-1-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\Delta (T/D)$ of 0 in. $^1$)

Figure F-1-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\Delta (T/D)$ of 0 in. $^1$)
Figure F-1-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-1-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figures F-1-13 through F-1-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

**Figure F-1-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).

**Figure F-1-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).
Figure F-1-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-1-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-1-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.°)

Figure F-1-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.°)
Figure F-1-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-1-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-1-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-1-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-1-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D) = 20 \times 10^{-6}$ in.$^{-1}$)

Figure F-1-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D) = 20 \times 10^{-6}$ in.$^{-1}$)
Figures F-1-25 through F-1-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

**Figure F-1-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the slab (177-in. joint spacing and $\Delta T/D$ of 0 in.).

**Figure F-1-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the slab (315-in. joint spacing and $\Delta T/D$ of 0 in.).
Figure F-1-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 20x10^{-6} in.\textsuperscript{-1})

Figure F-1-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 20x10^{-6} in.\textsuperscript{-1})
Figure F-1-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-1-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-1-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-1-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-1-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.).

Figure F-1-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.).
Figure F-1-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-1-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figures F-1-37 through F-1-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

![Graph showing stress vs. $\alpha(\Delta T/D)$ for different base/subbase thicknesses.]

**Figure F-1-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing).

![Graph showing stress vs. $\alpha(\Delta T/D)$ for different base/subbase thicknesses.]

**Figure F-1-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing).
Figure F-1-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-1-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-1-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-1-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-1-43 through F-1-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-1-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing).

**Figure F-1-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing).
Figure F-1-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-1-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-1-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-1-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-1-49 through F-1-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-1-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-1-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-1-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-2

Documentation of Pavement Responses for

32-kips Tandem Axle
Figures F-2-1 through F-2-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

![Figure F-2-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)](chart1)

![Figure F-2-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)](chart2)
Figure F-2-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-2-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-2-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-2-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-2-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})

Figure F-2-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})
Figure F-2-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-2-13 through F-2-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder)

**Figure F-2-13**: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-2-14**: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-2-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-2-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-2-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-2-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-2-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-2-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-2-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-4}$ in.$^{-1}$)

Figure F-2-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-4}$ in.$^{-1}$)
Figures F-2-25 through F-2-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

**Figure F-2-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.$^{-1}$)

**Figure F-2-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.$^{-1}$)
Figure F-2-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-2-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-2-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-2-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-2-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-2-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-2-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-2-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

<table>
<thead>
<tr>
<th>PCC thickness, in.</th>
<th>Stress, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>350</td>
</tr>
<tr>
<td>7</td>
<td>350</td>
</tr>
<tr>
<td>8</td>
<td>350</td>
</tr>
<tr>
<td>9</td>
<td>350</td>
</tr>
<tr>
<td>10</td>
<td>350</td>
</tr>
<tr>
<td>11</td>
<td>350</td>
</tr>
<tr>
<td>12</td>
<td>350</td>
</tr>
</tbody>
</table>

- PCC shoulder
- AC shoulder
- Widened lane

Figure F-2-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

<table>
<thead>
<tr>
<th>PCC thickness, in.</th>
<th>Stress, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>350</td>
</tr>
<tr>
<td>7</td>
<td>350</td>
</tr>
<tr>
<td>8</td>
<td>350</td>
</tr>
<tr>
<td>9</td>
<td>350</td>
</tr>
<tr>
<td>10</td>
<td>350</td>
</tr>
<tr>
<td>11</td>
<td>350</td>
</tr>
<tr>
<td>12</td>
<td>350</td>
</tr>
</tbody>
</table>

- PCC shoulder
- AC shoulder
- Widened lane
Figures F-2-37 through F-2-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder)

Figure F-2-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-2-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-2-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-2-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-2-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-2-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-2-43 through F-2-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder)

Figure F-2-43: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-2-44: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-2-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-2-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-2-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-2-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-2-49 through F-2-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-2-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-2-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-2-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-3

Documentation of Pavement Responses for

39-kips Tridem Axle
Figures F-3-1 through F-3-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

![Figure F-3-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)(3)](image)

![Figure F-3-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)(3)](image)
Figure F-3-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-3-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-3-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-3-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-3-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-3-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-3-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and \( \Delta T/D \) of 0 in.\(^{1} \))

Figure F-3-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and \( \Delta T/D \) of 0 in.\(^{1} \))
Figure F-3-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-3-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-3-13 through F-3-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

**Figure F-3-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-3-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-3-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.\(^{-1}\)).

Figure F-3-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.\(^{-1}\)).
Figure F-3-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-3-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-3-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D) = -20 \times 10^{-6}$ in.\(^{-1}\)).

Figure F-3-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D) = -20 \times 10^{-6}$ in.\(^{-1}\)).
Figure F-3-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{4})

Figure F-3-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{4})
Figure F-3-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-3-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-3-25 through F-3-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

**Figure F-3-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).

**Figure F-3-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).
Figure F-3-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-3-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figure F-3-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.$^{4}$)

Figure F-3-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.$^{4}$)

F-69
Figure F-3-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-3-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-3-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^1$)

Figure F-3-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^1$)
Figure F-3-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-3-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figures F-3-37 through F-3-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-3-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-3-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-3-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-3-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-3-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-3-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-3-43 through F-3-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-3-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing).

**Figure F-3-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing).

F-76
Figure F-3-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-3-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-3-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-3-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-3-49 through F-3-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-3-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-3-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-3-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-4

Documentation of Pavement Responses for

52-kips Quad Axle
Figures F-4-1 through F-4-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

**Figure F-4-1**: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-4-2**: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-4-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D) = 20\times10^{-6}$ in.$^{-1}$)

Figure F-4-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D) = 20\times10^{-6}$ in.$^{-1}$)
Figure F-4-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-4-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-4-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-4-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-4-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-4-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-4-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$).

Figure F-4-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$).
Figures F-4-13 through F-4-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder)

Figure F-4-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)

Figure F-4-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)
Figure F-4-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-4-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-4-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-4-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-4-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in. $^{-1}$).

Figure F-4-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in. $^{-1}$).
Figure F-4-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-4-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-4-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-4-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figures F-4-25 through F-4-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

Figure F-4-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$).

Figure F-4-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$).
Figure F-4-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 20x10^{-6} in.\(^{-1}\))

Figure F-4-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 20x10^{-6} in.\(^{-1}\))
Figure F-4-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-4-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-4-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-4-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-4-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-4-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-4-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-4-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-4-37 through F-4-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder)

![Graph 1](image1)

**Figure F-4-37**: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

![Graph 2](image2)

**Figure F-4-38**: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-4-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-4-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-4-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-4-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-4-43 through F-4-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

Figure F-4-43: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-4-44: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-4-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-4-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-4-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-4-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-4-49 through F-4-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder)

**Figure F-4-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-4-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-4-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-5

Documentation of Pavement Responses for

65-kips Multi-axle (5)
Figures F-5-1 through F-5-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-5-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-5-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

F-109
Figure F-5-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-5-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-5-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-5-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-5-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-5-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-5-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-5-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-5-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-5-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figures F-5-13 through F-5-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

**Figure F-5-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).

**Figure F-5-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).
Figure F-5-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-5-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-5-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)

Figure F-5-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)
Figure F-5-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^6$ in.$^{-1}$)

Figure F-5-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^6$ in.$^{-1}$)
Figure F-5-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(DT/D)$ of 0 in.$^{-1}$)

Figure F-5-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(DT/D)$ of 0 in.$^{-1}$)
Figure F-5-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-5-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-5-25 through F-5-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

Figure F-5-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)

Figure F-5-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)
Figure F-5-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-5-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-5-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.\textsuperscript{-1})

Figure F-5-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.\textsuperscript{-1})
Figure F-5-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-5-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-5-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-5-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-5-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-5-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figures F-5-37 through F-5-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-5-37**: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-5-38**: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-5-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-5-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-5-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-5-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-5-43 through F-5-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder)

**Figure F-5-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-5-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-5-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-5-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-5-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-5-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-5-49 through F-5-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-5-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-5-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-5-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab
Sub Appendix F-6

Documentation of Pavement Responses for

78-kips Multi-axle (6)
Figures F-6-1 through F-6-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-6-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.\(^{-1}\)).

Figure F-6-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.\(^{-1}\)).
Figure F-6-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-6-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{-1})

Figure F-6-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{-1})
Figure F-6-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-6-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.)

Figure F-6-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.)
Figure F-6-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-6-13 through F-6-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

**Figure F-6-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-6-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-6-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-6-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{4})

Figure F-6-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{4})
Figure F-6-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-6-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-6-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-6-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-6-25 through F-6-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

![Figure F-6-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{2})](image1)

![Figure F-6-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{2})](image2)
Figure F-6-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-6-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-6-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-6-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-6-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-6-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-6-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^3$)

Figure F-6-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^3$)
Figure F-6-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-6-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figures F-6-37 through F-6-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-6-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)**

**Figure F-6-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)**
Figure F-6-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-6-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-6-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-6-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-6-43 through F-6-48 illustrate the impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

![Figure F-6-43: Impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (177-in. joint spacing)](image1)

![Figure F-6-44: Impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (315-in. joint spacing)](image2)
Figure F-6-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-6-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-6-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-6-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-6-49 through F-6-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-6-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-6-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-6-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-7

Documentation of Pavement Responses for

91-kips Multi-axle (7)
Figures F-7-1 through F-7-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-7-1:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

**Figure F-7-2:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)
Figure F-7-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-7-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-7-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-7-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-7-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of \(-20\times10^{-6}\) in.\(^{-1}\))

Figure F-7-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of \(-20\times10^{-6}\) in.\(^{-1}\))
Figure F-7-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-7-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-7-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 20x10^-6 in.^{-1})

Figure F-7-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 20x10^-6 in.^{-1})
Figures F-7-13 through F-7-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder)

Figure F-7-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-7-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-7-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-7-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-7-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and \( \alpha(\Delta T/D) \) of 0 in.).

Figure F-7-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and \( \alpha(\Delta T/D) \) of 0 in.).
Figure F-7-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-7-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-7-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))

Figure F-7-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))
Figure F-7-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-7-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-7-25 through F-7-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

![Graph](image)

**Figure F-7-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$).

![Graph](image)

**Figure F-7-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$).

F-175
Figure F-7-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-7-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-7-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab
(177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-7-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab
(315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-7-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-7-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-7-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-7-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-7-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $2\times10^{-6}$ in.$^{-1}$)

Figure F-7-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $2\times10^{-6}$ in.$^{-1}$)
Figures F-7-37 through F-7-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-7-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-7-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-7-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-7-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-7-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-7-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-7-43 through F-7-48 illustrate the impact of modulus of subgrade reaction and product \( \alpha \Delta T/D \) on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

![Graph showing stress vs. \( \alpha \Delta T/D \) for different joint spacings and stress levels.](image)

**Figure F-7-43:** Impact of modulus of subgrade reaction and product \( \alpha \Delta T/D \) on longitudinal stress at bottom of the slab (177-in. joint spacing).

![Graph showing stress vs. \( \alpha \Delta T/D \) for different joint spacings and stress levels.](image)

**Figure F-7-44:** Impact of modulus of subgrade reaction and product \( \alpha \Delta T/D \) on longitudinal stress at bottom of the slab (315-in. joint spacing).
Figure F-7-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-7-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-7-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-7-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-7-49 through F-7-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-7-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-7-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-7-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab
Sub Appendix F-8

Documentation of Pavement Responses for

104-kips Multi-axle (8)
Figures F-8-1 through F-8-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-8-1:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-8-2:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-8-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-8-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-8-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)

Figure F-8-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)
Figure F-8-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-8-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-8-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-8-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-8-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.\(^{-1}\))

Figure F-8-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.\(^{-1}\))
Figures F-8-13 through F-8-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder)

Figure F-8-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-8-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-8-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-8-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-8-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-8-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-8-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-8-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-8-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^4$)

Figure F-8-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^4$)
Figure F-8-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-8-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.\(^{-1}\))
Figures F-8-25 through F-8-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction)

Figure F-8-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-8-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-8-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-8-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-8-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-8-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-8-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-8-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-8-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-8-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-8-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-8-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-8-37 through F-8-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-8-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-8-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-8-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-8-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-8-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-8-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-8-43 through F-8-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-8-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-8-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-8-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-8-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-8-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-8-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-8-49 through F-8-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-8-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-8-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-8-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-9

Documentation of Pavement Responses for

MI-2

Designated Loading
Frost Law Restriction

9'

36"

15,400
10,000
16,000
10,400
16,000
10,400
Figures F-9-1 through F-9-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

![Graph](image)

Figure F-9-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

![Graph](image)

Figure F-9-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
### Figure F-9-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

<table>
<thead>
<tr>
<th>PCC thickness, in.</th>
<th>Stress, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>450</td>
</tr>
<tr>
<td>7</td>
<td>400</td>
</tr>
<tr>
<td>8</td>
<td>350</td>
</tr>
<tr>
<td>9</td>
<td>300</td>
</tr>
<tr>
<td>10</td>
<td>250</td>
</tr>
<tr>
<td>11</td>
<td>200</td>
</tr>
<tr>
<td>12</td>
<td>150</td>
</tr>
</tbody>
</table>

#### Key:
- □ 4-in. base/subbase
- ■ 16-in. base/subbase
- □ 26-in. base/subbase

### Figure F-9-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

<table>
<thead>
<tr>
<th>PCC thickness, in.</th>
<th>Stress, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>600</td>
</tr>
<tr>
<td>7</td>
<td>550</td>
</tr>
<tr>
<td>8</td>
<td>500</td>
</tr>
<tr>
<td>9</td>
<td>450</td>
</tr>
<tr>
<td>10</td>
<td>400</td>
</tr>
<tr>
<td>11</td>
<td>350</td>
</tr>
<tr>
<td>12</td>
<td>300</td>
</tr>
</tbody>
</table>

#### Key:
- □ 4-in. base/subbase
- ■ 16-in. base/subbase
- □ 26-in. base/subbase
Figure F-9-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)

Figure F-9-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^3$)
Figure F-9-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-9-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-9-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-9-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-9-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-9-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-9-13 through F-9-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

Figure F-9-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\)).

Figure F-9-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\)).
Figure F-9-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-9-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figure F-9-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\))

Figure F-9-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\))
Figure F-9-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-9-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-9-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-9-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-9-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.-1)

Figure F-9-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.-1)
Figures F-9-25 through F-9-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction)

Figure F-9-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.).

Figure F-9-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.).
Figure F-9-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-9-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-9-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

Figure F-9-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)
Figure F-9-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-9-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-9-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in. \(^{-1}\))

Figure F-9-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in. \(^{-1}\))
Figure F-9-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-9-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-9-37 through F-9-42 illustrate the impact of base/subbase thickness and product \( \alpha(\Delta T/D) \) on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-9-37:** Impact of base/subbase thickness and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-9-38:** Impact of base/subbase thickness and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-9.39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-9.40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-9-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-9-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-9-43 through F-9-48 illustrate the impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-9-43:** Impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (177-in. joint spacing).

**Figure F-9-44:** Impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (315-in. joint spacing).
Figure F-9-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-9-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-9-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-9-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-9-49 through F-9-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-9-49**: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-9-50**: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-9-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-10

Documentation of Pavement Responses for

MI-7
Figures F-10-1 through F-10-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

![Graph](image1)

**Figure F-10-1**: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

![Graph](image2)

**Figure F-10-2**: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-10-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-10-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-10-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\))

Figure F-10-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\))
Figure F-10-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\textsuperscript{-1})

Figure F-10-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\textsuperscript{-1})
Figure F-10-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.)

Figure F-10-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.)
Figure F-10-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-10-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-10-13 through F-10-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder)

Figure F-10-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-10-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-10-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-10-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-10-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.^[1])

Figure F-10-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.^[1])
Figure F-10-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha (\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-10-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha (\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-10-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-10-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-10-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-10-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-10-25 through F-10-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

Figure F-10-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-10-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-10-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-10-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-10-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-10-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-10-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-10-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-10-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and \(\Delta T/D\) of 0 in.)

Figure F-10-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and \(\Delta T/D\) of 0 in.)
Figure F-10-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-10-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-10-37 through F-10-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-10-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-10-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-10-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-10-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-10-41: Impact of base/subbase thickness and product $a(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-10-42: Impact of base/subbase thickness and product $a(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-10-43 through F-10-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-10-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-10-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-10-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-10-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-10-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-10-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-10-49 through F-10-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-10-49: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

Figure F-10-50: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-10-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab
Sub Appendix F-11

Documentation of Pavement Responses for

MI-8
Figures F-11-1 through F-11-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

![Diagram showing stress variation with PCC thickness and base/subbase thickness](image)

**Figure F-11-1:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

![Diagram showing stress variation with PCC thickness and base/subbase thickness](image)

**Figure F-11-2:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-11-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-11-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-11-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)

Figure F-11-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)
Figure F-11-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-11-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-11-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.)

Figure F-11-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.)
Figure F-11-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-11-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-11-13 through F-11-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

**Figure F-11-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).

**Figure F-11-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).
Figure F-11-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and \( \alpha(\Delta T/D) \) of 20x10^{-6} in.\(^{-1}\)).

Figure F-11-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and \( \alpha(\Delta T/D) \) of 20x10^{-6} in.\(^{-1}\)).
Figure F-11-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^4\))

Figure F-11-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^4\))
Figure F-11-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-11-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-11.21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-11.22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-11-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-11-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figures F-11-25 through F-11-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction)

Figure F-11-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)

Figure F-11-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)
Figure F-11-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-11-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-11-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\)).

Figure F-11-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\)).
Figure F-11-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in$^{-1}$)

Figure F-11-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in$^{-1}$)
Figure F-11-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-11-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-11-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-11-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-11-37 through F-11-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-11-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing).

Figure F-11-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing).
Figure F-11-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-11-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-11-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-11-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-11-43 through F-11-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-11-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-11-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-11-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-11-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-11-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-11-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-11-49 through F-11-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-11-49**: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-11-50**: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-11-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab
Sub Appendix F-12

Documentation of Pavement Responses for

Designated Loading 15,400 16,000 16,000 18,000 18,000 18,000
Frost Law Restriction 10,000 10,400 10,400 11,700 11,700 11,700

MI-9
Figures F-12-1 through F-12-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-12-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.⁻¹)

Figure F-12-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.⁻¹)
Figure F-12-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-12-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-12-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.)

Figure F-12-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.)
Figure F-12-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-12-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-12-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{4})

Figure F-12-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{4})
Figure F-12-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 20x10^-6 in.^-1)

Figure F-12-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 20x10^-6 in.^-1)
Figures F-12-13 through F-12-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

![Stress vs. PCC thickness](image1)

Figure F-12-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)

![Stress vs. PCC thickness](image2)

Figure F-12-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)
Figure F-12-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-12-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-12-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})

Figure F-12-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})
Figure F-12-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$).

Figure F-12-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$).
Figure F-12-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-12-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-12-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-12-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-12-25 through F-12-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

Figure F-12-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-12-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-12-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-12-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-12-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-12-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

F-312
Figure F-12-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-12-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-12-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))

Figure F-12-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))
Figure F-12-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-12-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-12-37 through F-12-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-12-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-12-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-12-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-12-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-12-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-12-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-12-43 through F-12-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-12-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-12-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-12-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-12-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-12-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-12-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-12-49 through F-12-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-12-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-12-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-12-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-13

Documentation of Pavement Responses for

Designated Loading
Frost Law Restriction
15,400
10,000

16,000
10,400

16,000
10,400

18,000
11,700

13,000
8,450

9'
3’6”
9’
9’
3’6”

MI-11
Figures F-13-1 through F-13-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-13-1:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in. 

**Figure F-13-2:** Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.)
Figure F-13-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-13-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-13-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)

Figure F-13-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)
Figure F-13-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-13-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-13-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)

Figure F-13-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^1$)
Figure F-13-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and \( \alpha(\Delta T/D) \) of \( 20 \times 10^{-6} \text{ in.}^{-1} \))

Figure F-13-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and \( \alpha(\Delta T/D) \) of \( 20 \times 10^{-6} \text{ in.}^{-1} \))
Figures F-13-13 through F-13-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

Figure F-13-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\Delta T/D$ of 0 in.$^{-1}$).

Figure F-13-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\Delta T/D$ of 0 in.$^{-1}$).
Figure F-13-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$).

Figure F-13-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$).
Figure F-13-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-13-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-13-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-13-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-13-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).

Figure F-13-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).
Figure F-13-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of \(20 \times 10^{-6}\) in.\(^{-1}\))

Figure F-13-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of \(20 \times 10^{-6}\) in.\(^{-1}\))
Figures F-13-25 through F-13-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

**Figure F-13-25**: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

**Figure F-13-26**: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)
Figure F-13-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-13-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-13-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{-1})

Figure F-13-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{-1})
Figure F-13-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-13-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-13-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^4\))

Figure F-13-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^4\))
Figure F-13-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-13-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-13-37 through F-13-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder)

**Figure F-13-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-13-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-13-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-13-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-13-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-13-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-13-43 through F-13-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

Figure F-13-43: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-13-44: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-13-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-13-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-13-47: Impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-13-48: Impact of modulus of subgrade reaction and product \( \alpha(\Delta T/D) \) on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-13-49 through F-13-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-13-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-13-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-13-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab
Sub Appendix F-14

Documentation of Pavement Responses for

MI-12
Figures F-14-1 through F-14-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-14-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\)).

Figure F-14-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of 0 in.\(^{-1}\)).
Figure F-14-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-14-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-14-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-14-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-14-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-14-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-14-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

Figure F-14-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)
Figure F-14-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-14-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-14-13 through F-14-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder)

![Graph](image)

Figure F-14-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.³)

![Graph](image)

Figure F-14-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.³)
Figure F-14-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-14-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figure F-14-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-14-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-14-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-14-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-14-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))

Figure F-14-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))
Figure F-14-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-14-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figures F-14-25 through F-14-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

**Figure F-14-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in. $^3$)

**Figure F-14-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in. $^3$)
Figure F-14-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-14-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-14-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))

Figure F-14-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))
Figure F-14-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-14-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-14-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-14-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-14-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-14-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-14-37 through F-14-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-14-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-14-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-14-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-14-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-14-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-14-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-14-43 through F-14-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-14-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-14-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-14-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-14-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-14-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-14-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-14-49 through F-14-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-14-49: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab**

**Figure F-14-50: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab**
Figure F-14-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-15

Documentation of Pavement Responses for MI-13
Figures F-15-1 through F-15-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

![Figure F-15-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta (T/D)$ of 0 in. $^{-1}$)](image1)

![Figure F-15-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta (T/D)$ of 0 in. $^{-1}$)](image2)
Figure F-15-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-15-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-15-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)

Figure F-15-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)
Figure F-15-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-15-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-15-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

Figure F-15-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)
Figure F-15-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-15-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-15-13 through F-15-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).
Figure F-15-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-15-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-15-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})

Figure F-15-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})
Figure F-15-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-15-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-15-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and \( \alpha(\Delta T/D) \) of 0 in.)

Figure F-15-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and \( \alpha(\Delta T/D) \) of 0 in.)
Figure F-15-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-15-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-15-25 through F-15-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

Figure F-15-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-15-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-15-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-15-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-15-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and η(ΔT/D) of 0 in.⁻¹)

Figure F-15-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and η(ΔT/D) of 0 in.⁻¹)
Figure F-15-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-15-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-15-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-15-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-15-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in. $^{-1}$)

Figure F-15-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in. $^{-1}$)
Figures F-15-37 through F-15-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-15-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)**

**Figure F-15-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)**
Figure F-15-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-15-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-15-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-15-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-15-43 through F-15-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-15-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-15-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-15-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-15-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-15-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-15-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-15-49 through F-15-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-15-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-15-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-15-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-16

Documentation of Pavement Responses for MI-16

![Diagram of a truck with dimensions and loadings]

- Designated Loading:
  - 15,400
  - 13,000
  - 13,000
  - 13,000
  - 13,000
  - 13,000
  - 16,000
  - 16,000

- Frost Law Restriction:
  - 10,000
  - 8,450
  - 8,450
  - 8,450
  - 8,450
  - 8,450
  - 10,400
  - 10,400
Figures F-16-1 through F-16-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

Figure F-16-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

Figure F-16-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta(T/D)$ of 0 in.$^{-1}$)

F-406
Figure F-16-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-16-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-16-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-16-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-16-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-16-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-16-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-16-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-16-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-16-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-16-13 through F-16-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

Figure F-16-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)

Figure F-16-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)
Figure F-16-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-16-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-16-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))

Figure F-16-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\))
Figure F-16-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-16-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-16-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.)

Figure F-16-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.)
Figure F-16-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-16-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figures F-16-25 through F-16-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction)

![Graph showing stress variation with PCC thickness and lateral support condition](image)

**Figure F-16-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

![Graph showing stress variation with PCC thickness and lateral support condition](image)

**Figure F-16-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-16-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-16-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-16-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\)).

Figure F-16-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\)).
Figure F-16-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\textsuperscript{-1})

Figure F-16-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\textsuperscript{-1})
Figure F-16-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-16-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-16-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $a(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-16-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $a(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figures F-16-37 through F-16-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-16-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-16-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-16-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-16-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-16-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-16-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-16-43 through F-16-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).
Figure F-16-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-16-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-16-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-16-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-16-49 through F-16-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-16-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-16-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-16-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-17

Documentation of Pavement Responses for

MI-17
Figures F-17-1 through F-17-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

Figure F-17-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-17-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-17-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-17-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-17-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-17-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-17-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)

Figure F-17-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20\times10^{-6}$ in.$^{-1}$)
Figure F-17-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-17-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-17-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-17-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-17-13 through F-17-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

**Figure F-17-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

**Figure F-17-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-17-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-17-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-17-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{\text{a}}$)

Figure F-17-18: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{\text{a}}$)
Figure F-17-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$).

Figure F-17-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$).
Figure F-17-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{1}$)

Figure F-17-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{1}$)
Figure F-17-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-17-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-17-25 through F-17-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction)

![Graph showing the impact of PCC thickness and lateral support condition on stresses.](image1)

**Figure F-17-25:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\Delta T/D$ of 0 in.$^{-1}$)

![Graph showing the impact of PCC thickness and lateral support condition on stresses.](image2)

**Figure F-17-26:** Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\Delta T/D$ of 0 in.$^{-1}$)
Figure F-17-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-17-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-17-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)

Figure F-17-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$)
Figure F-17-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of -$20\times10^{-6}$ in.\(^{-1}$)

Figure F-17-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of -$20\times10^{-6}$ in.\(^{-1}$)
Figure F-17-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\)).

Figure F-17-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\(^{-1}\)).
Figure F-17-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and \( \alpha(\Delta T/D) \) of 20x10^{-6} in.^{-1})

Figure F-17-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and \( \alpha(\Delta T/D) \) of 20x10^{-6} in.^{-1})
Figures F-17-37 through F-17-42 illustrate the impact of base/subbase thickness and product \( \alpha(\Delta T/D) \) on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

---

**Figure F-17-37:** Impact of base/subbase thickness and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (177-in. joint spacing).

---

**Figure F-17-38:** Impact of base/subbase thickness and product \( \alpha(\Delta T/D) \) on longitudinal stress at bottom of the slab (315-in. joint spacing).

---

F-451
Figure F-17-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-17-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-17-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-17-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-17-43 through F-17-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-17-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-17-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-17-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-17-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-17-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-17-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-17-49 through F-17-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-17-49**: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-17-50**: Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-17-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab.
Sub Appendix F-18

Documentation of Pavement Responses for

MI-19
Figures F-18-1 through F-18-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-18-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-18-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-18-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-18-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-18-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-18-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-18-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-18-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-18-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.\(^{-1}\))

Figure F-18-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.\(^{-1}\))
Figure F-18-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in. $^{-1}$)

Figure F-18-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-18-13 through F-18-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

![Graph showing impact of PCC thickness and modulus on longitudinal stress at bottom of the slab](image)

**Figure F-18-13:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

![Graph showing impact of PCC thickness and modulus on longitudinal stress at bottom of the slab](image)

**Figure F-18-14:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-18-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\Delta T/D$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-18-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\Delta T/D$ of $20 \times 10^{-6}$ in.$^{-1}$)
<table>
<thead>
<tr>
<th>PCC thickness, in.</th>
<th>Stress, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>30-psi/in.</td>
</tr>
<tr>
<td>7</td>
<td>100-psi/in.</td>
</tr>
<tr>
<td>8</td>
<td>200-psi/in.</td>
</tr>
</tbody>
</table>

**Figure F-18-17:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

<table>
<thead>
<tr>
<th>PCC thickness, in.</th>
<th>Stress, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>30-psi/in.</td>
</tr>
<tr>
<td>7</td>
<td>100-psi/in.</td>
</tr>
<tr>
<td>8</td>
<td>200-psi/in.</td>
</tr>
</tbody>
</table>

**Figure F-18-18:** Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-18-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$).

Figure F-18-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$.)
Figure F-18-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^4$)

Figure F-18-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^4$)
Figure F-18-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-18-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-18-25 through F-18-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction)

Figure F-18-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{\text{0.5}}$)

Figure F-18-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{\text{0.5}}$)
Figure F-18-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-18-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-18-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-18-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-18-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))

Figure F-18-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.\(^{-1}\))
Figure F-18-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-18-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-18-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-18-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-18-37 through F-18-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

![Graph](image)

**Figure F-18-37:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

![Graph](image)

**Figure F-18-38:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-18-39: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-18-40: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-18-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-18-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-18-43 through F-18-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

**Figure F-18-43:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

**Figure F-18-44:** Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-18-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-18-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-18-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-18-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-18-49 through F-18-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-18-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab.

**Figure F-18-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab.
Figure F-18-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab
Sub Appendix F-19

Documentation of Pavement Responses for

MI-20
Figures F-19-1 through F-19-12 illustrate the impact of PCC thickness and base/subbase thickness on stresses (100-psi/in. modulus of subgrade reaction and PCC shoulder)

Figure F-19-1: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)

Figure F-19-2: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$)
Figure F-19-3: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-19-4: Impact of PCC thickness and base/subbase thickness on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figure F-19-5: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)

Figure F-19-6: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^2$)
Figure F-19-7: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-19-8: Impact of PCC thickness and base/subbase thickness on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-19-9: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)

Figure F-19-10: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.)
Figure F-19-11: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-19-12: Impact of PCC thickness and base/subbase thickness on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-19-13 through F-19-24 illustrate the impact of PCC thickness and modulus of subgrade reaction on stresses (16-in. base/subbase thickness and PCC shoulder).

Figure F-19-13: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).

Figure F-19-14: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^{-1}$).
Figure F-19-15: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).

Figure F-19-16: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$).
Figure F-19-17: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)

Figure F-19-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.$^4$)
Figure F-19-19: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)

Figure F-19-20: Impact of PCC thickness and modulus of subgrade reaction on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $-20 \times 10^{-6}$ in.$^{-1}$)
Figure F-19-21: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})

Figure F-19-22: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.\textsuperscript{1})
Figure F-19-23: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)

Figure F-19-24: Impact of PCC thickness and modulus of subgrade reaction on transverse stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20 \times 10^{-6}$ in.$^{-1}$)
Figures F-19-25 through F-19-36 illustrate the impact of PCC thickness and lateral support condition on stresses (16-in. base/subbase and 100-psi/in. modulus of subgrade reaction).

Figure F-19-25: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$).

Figure F-19-26: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in. $^{-1}$).
Figure F-19-27: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)

Figure F-19-28: Impact of PCC thickness and lateral support condition on longitudinal stress at bottom of the slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of $20\times10^{-6}$ in.$^{-1}$)
Figure F-19-29: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.1)

Figure F-19-30: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and $\alpha(\Delta T/D)$ of 0 in.1)
Figure F-19-31: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (177-in. joint spacing and \(\alpha(\Delta T/D)\) of \(-20\times10^{-6}\) in.\(^{-1}\))

Figure F-19-32: Impact of PCC thickness and lateral support condition on longitudinal stress at top of the Slab (315-in. joint spacing and \(\alpha(\Delta T/D)\) of \(-20\times10^{-6}\) in.\(^{-1}\))

Figure F-19-33: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and α(ΔT/D) of 0 in.4)

Figure F-19-34: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and α(ΔT/D) of 0 in.4)
Figure F-19-35: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (177-in. joint spacing and $a(\Delta T/D)$ of 20x10^{-6} in.\(^{-1}\))

Figure F-19-36: Impact of PCC thickness and lateral support condition on transverse stress at bottom of the Slab (315-in. joint spacing and $a(\Delta T/D)$ of 20x10^{-6} in.\(^{-1}\))
Figures F-19-37 through F-19-42 illustrate the impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

Figure F-19-37: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-19-38: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
**Figure F-19-39:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

**Figure F-19-40:** Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-19-41: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-19-42: Impact of base/subbase thickness and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-19-43 through F-19-48 illustrate the impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness and PCC shoulder).

Figure F-19-43: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (177-in. joint spacing)

Figure F-19-44: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab (315-in. joint spacing)
Figure F-19-45: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (177-in. joint spacing)

Figure F-19-46: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab (315-in. joint spacing)
Figure F-19-47: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (177-in. joint spacing)

Figure F-19-48: Impact of modulus of subgrade reaction and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab (315-in. joint spacing)
Figures F-19-49 through F-19-51 illustrate the impact of joint spacing and product $\alpha(\Delta T/D)$ on stresses (10-in. PCC thickness, 16-in. base/subbase thickness, 100-psi/in. modulus of subgrade reaction and PCC shoulder).

**Figure F-19-49:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at bottom of the slab

**Figure F-19-50:** Impact of joint spacing and product $\alpha(\Delta T/D)$ on longitudinal stress at top of the slab
Figure F-19-51: Impact of joint spacing and product $\alpha(\Delta T/D)$ on transverse stress at bottom of the slab