Case 7.1. Slab cracking due to improper depth of reinforcement.

Cracking of a slab was visible in one bay of an older building on the top surface of the elevated slab. Other bays exhibited no cracking.

The GPR was brought in to investigate the reinforcement placement. First, a crack-free area was examined, then the cracked area. Both areas were centered on columns and were large enough to capture the slab reinforcement around the columns, middle strip, and column strip areas for comparison.

Collection of larger 3D **Ground Penetrating Radar (GPR)** data sets allows practitioners a bird's eye view and allow clearly identifying problem compared to rudimentary cross section only GPR scans.

Cracked area: ***Fig. 4*** and ***Fig. 5*** are shown at the same depths as ***Fig. 2*** and ***Fig. 3***.

Crack-free area: The two images below are the top reinforcement (***Fig. 2***) and bottom reinforcement (***Fig. 3***).

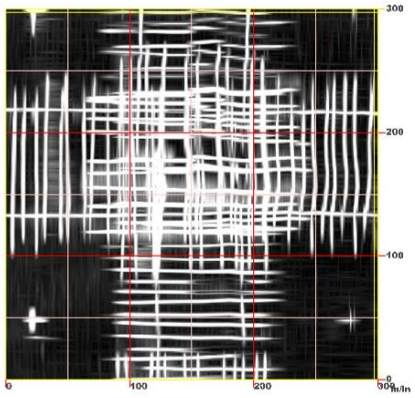

Fig. 2. Top reinforcement, crack-free area.

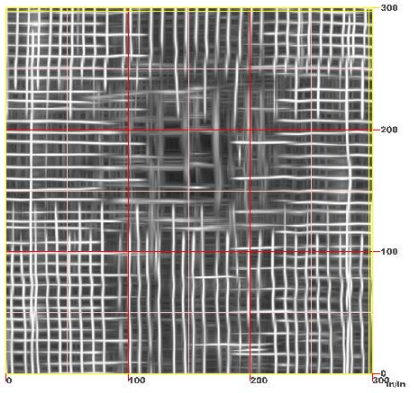

Fig. 3. Bottom reinforcement, crack-free area.

A 1600 MHz GPR frequency was used, and the area below is 25 feet x 25 feet in size (in yellow) ***Fig. 1***:

Fig. 1. Examined slab.

Cracked area: ***Fig. 4*** and ***Fig. 5*** are shown at the same depths as ***Fig. 2*** and ***Fig. 3***.

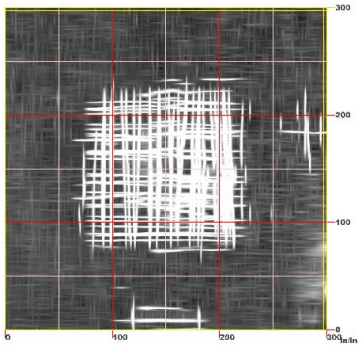

Fig. 4. Top reinforcement, cracked area.

Fig. 4 reveals that the column strip reinforcement was not present at the required shallow depth which would have prevented the cracking as in ***Fig 2***.

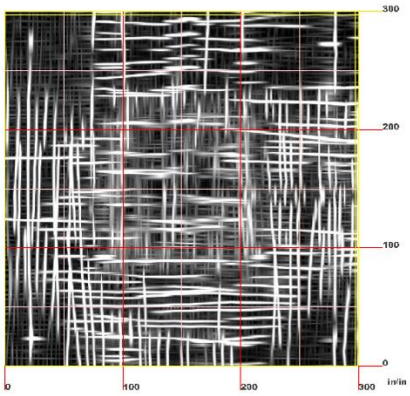

Fig. 5. Bottom reinforcement, cracked area.

Fig. 5 reveals that the column strip reinforcement was present but had dropped lower during concrete placement.

Testing and reporting by **NDTitan Todd Allen**