

gradient through the thickness of the concrete slab. The computed temperatures on the bottom of the slab and in the floor beams were barely above ambient.

Floor 8

Figure 10–8 and Figure 10–9 show the thermal response of Floor 8 at 12 different instants in time ranging from 12:30 p.m. to 6:00 p.m. at half hour intervals. The pattern of the heated structural components was similar to the 7th floor, but the temperature increases in the concrete slab were much smaller. This was a result of the fire on the west side of the 8th floor being less intense until mid-afternoon.

During the course of the simulation, the 8th floor beams heated up significantly due to the fire on the 7th floor. Initial heating of the floor beams was observed in the southwest corner at 1:00 p.m. At approximately 2:00 p.m., the floor beams in the northwest corner exhibited temperatures in the range of 500 ° to 550 °C. As the fires evolved and spread on Floor 7, the central portion of the floor beams heated up as observed at 4:00 p.m. Toward the end of the simulation, the fires were concentrated in the northeast corner, in the vicinity of Column 79.

The increased temperatures on the top of the floor slab followed the fire as it moved across the north face from west to east. The temperatures in the northeast corner floor beams were above 675 °C near 5:00 p.m.

The insulation on the interior and exterior columns functioned as intended. The column temperatures rose by less than 100 °C in the simulation.

Floor 9

Figure 10–10 and Figure 10–11 show the thermal response of Floor 9. The timing and intensity of the floor slab heating relative to the 8th floor heating were consistent with the FDS simulation of the 9th floor fire being the same as for the 8th floor, but delayed by one hour. The column temperatures rose less than 100 °C. The temperature rise in the floor beams was lower than that on the 8th floor, reflecting the shorter duration 8th floor fire having less time to heat the steel through the insulation layer.

Floor 10

Figure 10–12 and Figure 10–13 show the thermal response of the 10th floor. Due to the absence of a fire on this floor, the floor slab and the columns were heated only by conduction and remain relatively cool. The peak floor beam temperatures, resulting from the fire on the 9th floor, did not exceed about 400 °C.

Floor 11

Figure 10–14 and Figure 10–15 show the thermal response of the 11th floor. In Figure 10–15, the cold floor beams reflected the absence of a fire on the 10th floor. The fire on the 11th floor caused only a modest temperature rise in the insulated columns. The temperature on the top of the floor slab approached 600 °C on the east side of the floor.