Similarly, from Fig. 7.5.4, the column forces, the shears, and the moments in the interior columns become:

$$V_4 - V'_4 + R_4 = 0 \qquad \therefore \quad V'_4 = \frac{4}{40}\left(\frac{h}{l}\right)W,$$

$$V_3 - V'_3 + R_3 - R_4 = 0 \qquad \therefore \quad V'_3 = \frac{16}{40}\left(\frac{h}{l}\right)W,$$

$$V_2 - V'_2 + R_2 - R_3 = 0 \qquad \therefore \quad V'_2 = \frac{32}{40}\left(\frac{h}{l}\right)W,$$

$$V_1 - V'_1 + R_1 - R_2 = 0 \qquad \therefore \quad V'_1 = \frac{48}{40}\left(\frac{h}{l}\right)W,$$

$$H''_4\frac{h}{2} - V_4\frac{l}{2} - V'_4\frac{l}{2} = 0 \qquad \therefore \quad H''_4 = \frac{7}{40}W,$$

$$H''_3\frac{h}{2} + H''_4\frac{h}{2} - V_3\frac{l}{2} - V'_3\frac{l}{2} = 0 \quad \therefore \quad H''_3 = \frac{21}{40}W,$$

$$H''_2\frac{h}{2} + H''_3\frac{h}{2} - V_2\frac{l}{2} - V'_2\frac{l}{2} = 0 \quad \therefore \quad H''_2 = \frac{35}{40}W,$$

$$H''_1\frac{h}{2} + H''_2\frac{h}{2} - V_1\frac{l}{2} - V'_1\frac{l}{2} = 0 \quad \therefore \quad H''_1 = \frac{49}{50}W; \quad H''_0 = H''_1,$$

$$M_4 = V_4\frac{l}{2} = \frac{3}{80}Wh, \qquad M'_4 = H''_4\frac{h}{2} = \frac{7}{80}Wh,$$

$$M'''_4 = V'_4\frac{l}{2} = \frac{4}{80}Wh,$$

$$M_3 = V_3\frac{l}{2} = \frac{12}{80}Wh, \quad M''_3 = H''_4\frac{h}{2} = \frac{7}{80}Wh, \quad M'_3 = H''_3\frac{h}{2} = \frac{21}{80}Wh,$$

$$M'''_3 = V'_3\frac{l}{2} = \frac{16}{80}Wh,$$

$$M_2 = V_2\frac{l}{2} = \frac{24}{80}Wh, \quad M''_2 = H''_3\frac{h}{2} = \frac{21}{80}Wh, \quad M'_2 = H''_2\frac{h}{2} = \frac{35}{80}Wh,$$

$$M'''_2 = V'_2\frac{l}{2} = \frac{32}{80}Wh,$$

$$M_1 = V_1\frac{l}{2} = \frac{36}{80}Wh, \quad M''_1 = H''_2\frac{h}{2} = \frac{35}{80}Wh, \quad M'_1 = H''_1\frac{h}{2} = \frac{49}{80}Wh,$$

$$M'''_1 = V'_1\frac{l}{2} = \frac{48}{80}Wh,$$

$$M''_0 = H''_1\frac{h}{2} = \frac{49}{80}Wh.$$

Example 7.5.1. Determine the vertical load moments in the frame of Fig. 7.5.5, assuming the frame to be one of a set 6 m (20 ft) on centers with a total uniform load of 10 kN/m² (200 psf).