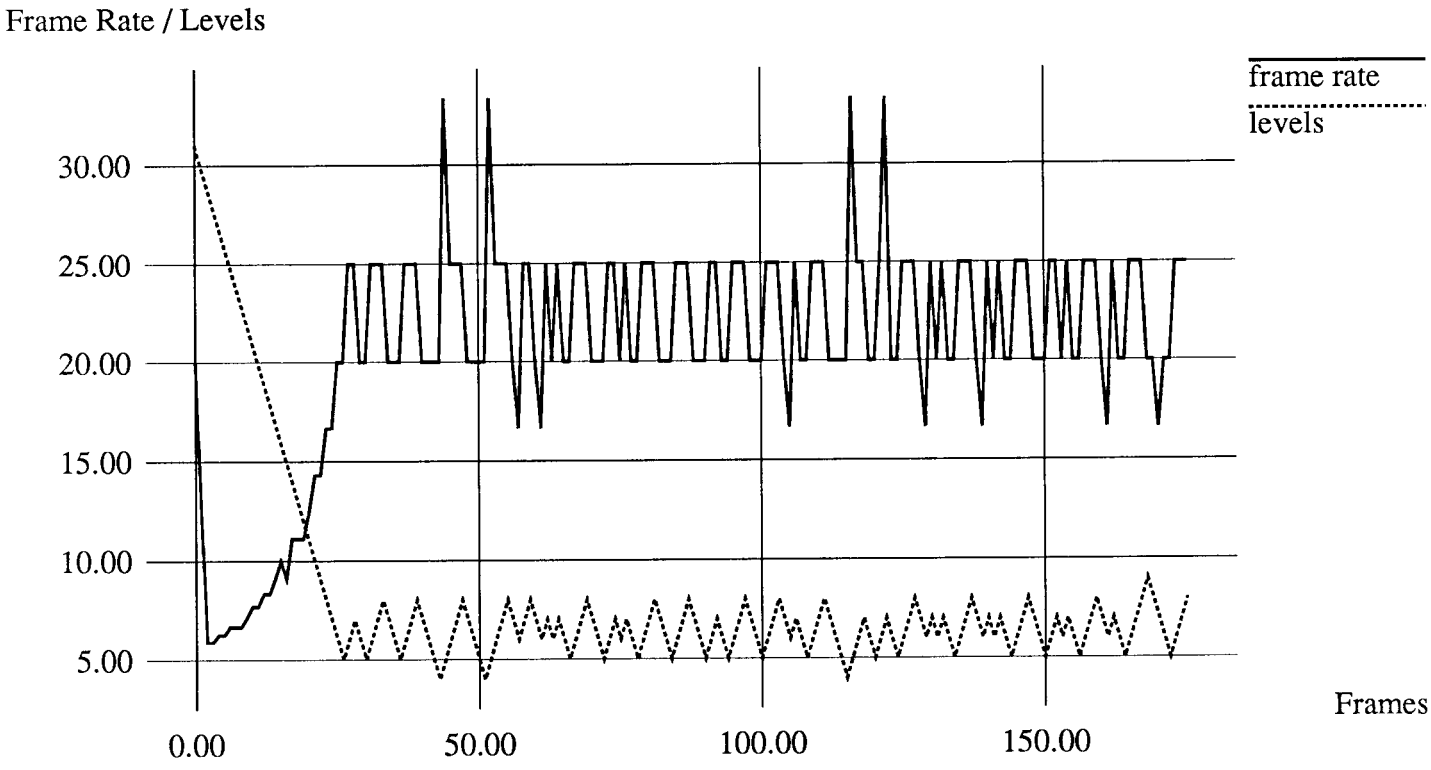

Figure 1.

Explanation: HMD was held still with large cluster of polygons in center of field of view. The level goes from 32 quickly to 5 or so, then oscillates between 4 and 8. The frame rate starts at 20 and quickly falls to 6, then climbs up to 20 and oscillates between 20 and 25.

Frame Rate Data:

number of polygons in scene: 18,000
number of frames: 176; (approx. 8 seconds)
desired rate: 20.00
mean: 20.77 SD: 7.12
low: 5.88; high: 33.34
percentage at or above desired rate: 79%
percentage at or above 75% of desired rate: 88%

Level Data:

total possible: 32
mean: 8.19 SD: 5.98
low: 4

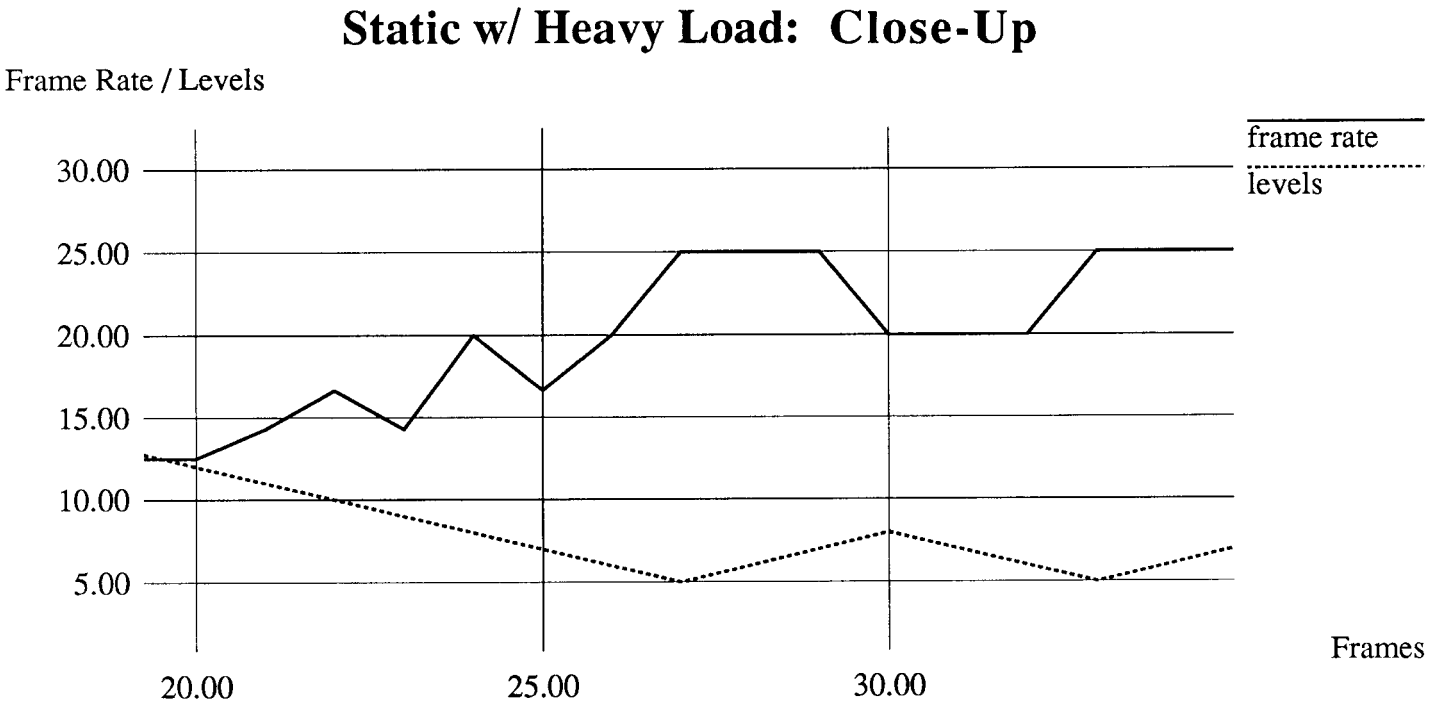

Figure 2.

Explanation: Close-up of the previous graph at point where frame rate begins to clear the 20Hz threshold. Note that when the frame rate drops from 25 to 20, the system drops the level until it goes back up to 25, then increases the level until it drops back to 20. This oscillation guarantees that the system is always doing as much as it can.

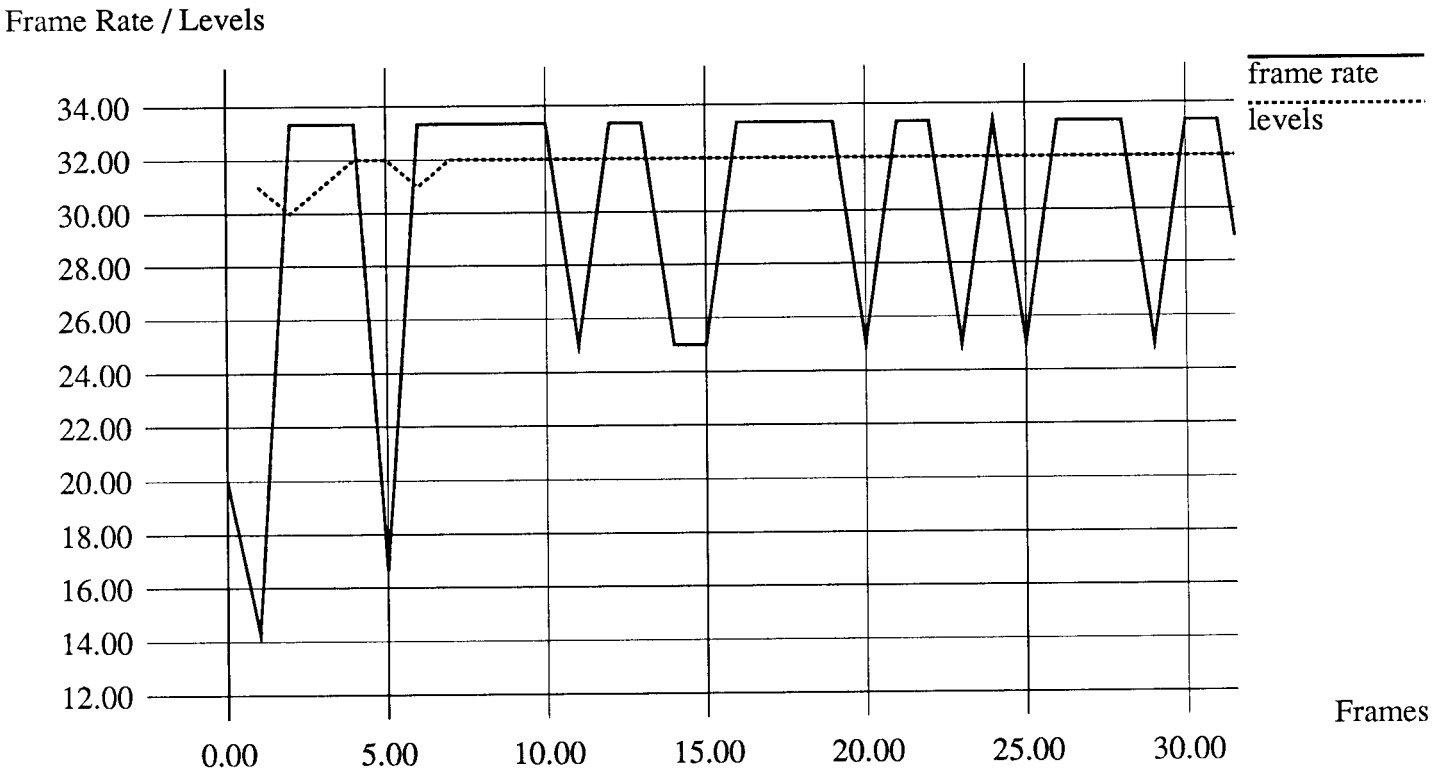

Figure 3.

Explanation: With a light load, the system quickly achieves and holds the desired frame rate with the level at 32. Oscillation from 25Hz to 33.3Hz is probably due to varying system load.

Frame Rate Data:

number of polygons in scene: 550
number of frames: 220; (approx. 11 seconds)
desired rate: 20.00
mean: 30.42 SD: 6.93
low: 14.29; high: 33.33
percentage at or above desired rate: 99%
percentage at or above 75% of desired rate: 100%

Level Data:

total possible: 32
mean: 31.98 SD: 5.66
low: 30

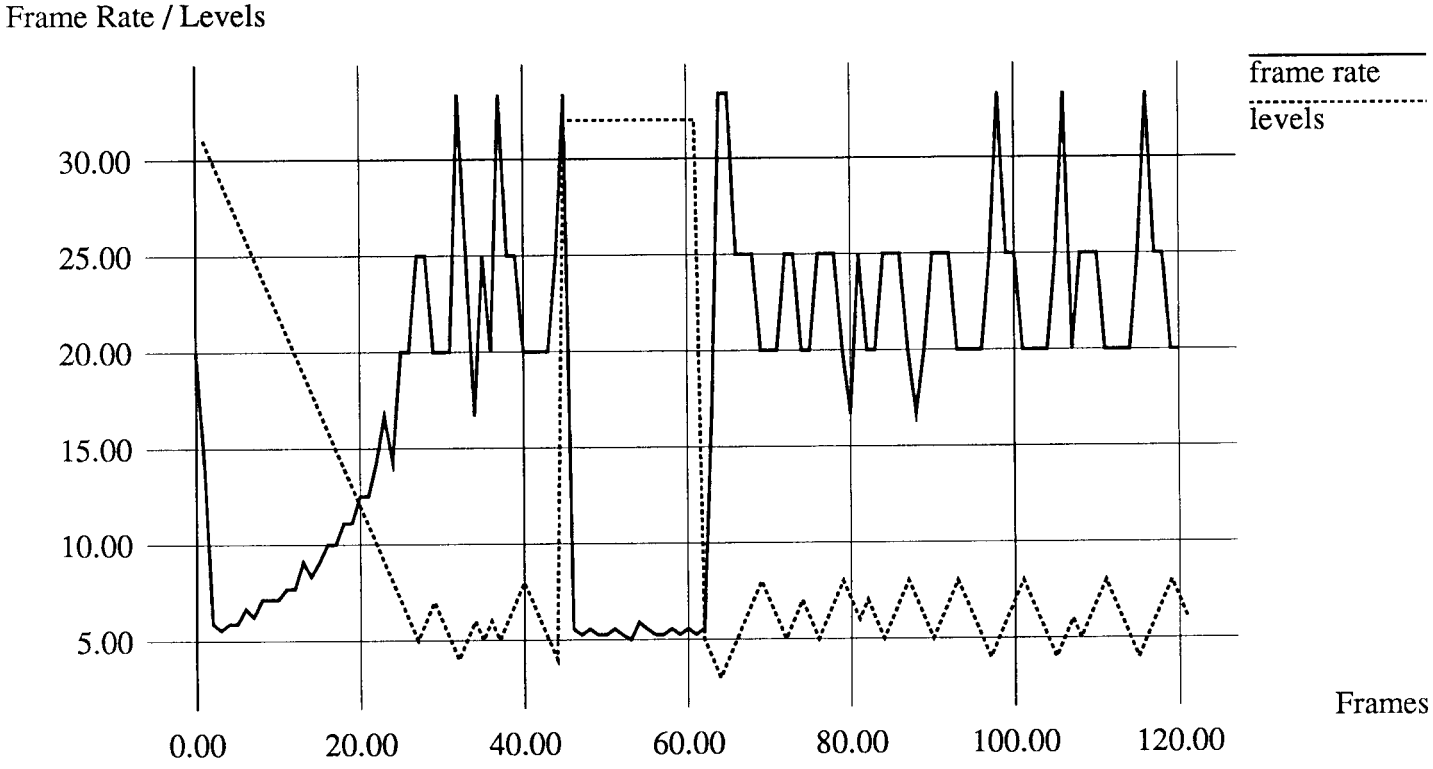

Figure 4.

Explanation: Here, the HMD is always looking at a large cluster of polygons, but at about the 45th frame, the slow motion button is held down for about 17 frames, which sends the level up to 32 and the frame rate down to about 5. Once the button is released, the system returns to its previous state. Note that the percentage at or above the desired rate (listed below) suffers because of the use of the slow-motion button. When the button is not pressed, the system does quite well at reaching the desired frame rate.

Frame Rate Data:

number of polygons in scene: 18,000
number of frames: 121; (approx. 6 seconds)
desired rate: 20.00
mean: 17.95 SD: 9.30
low: 5.00; high: 33.33
percentage at or above desired rate: 61.98%
percentage at or above 75% of desired rate: 66.94%

Level Data:

total possible: 32
mean: 12.33 SD: 10.67
low: 3

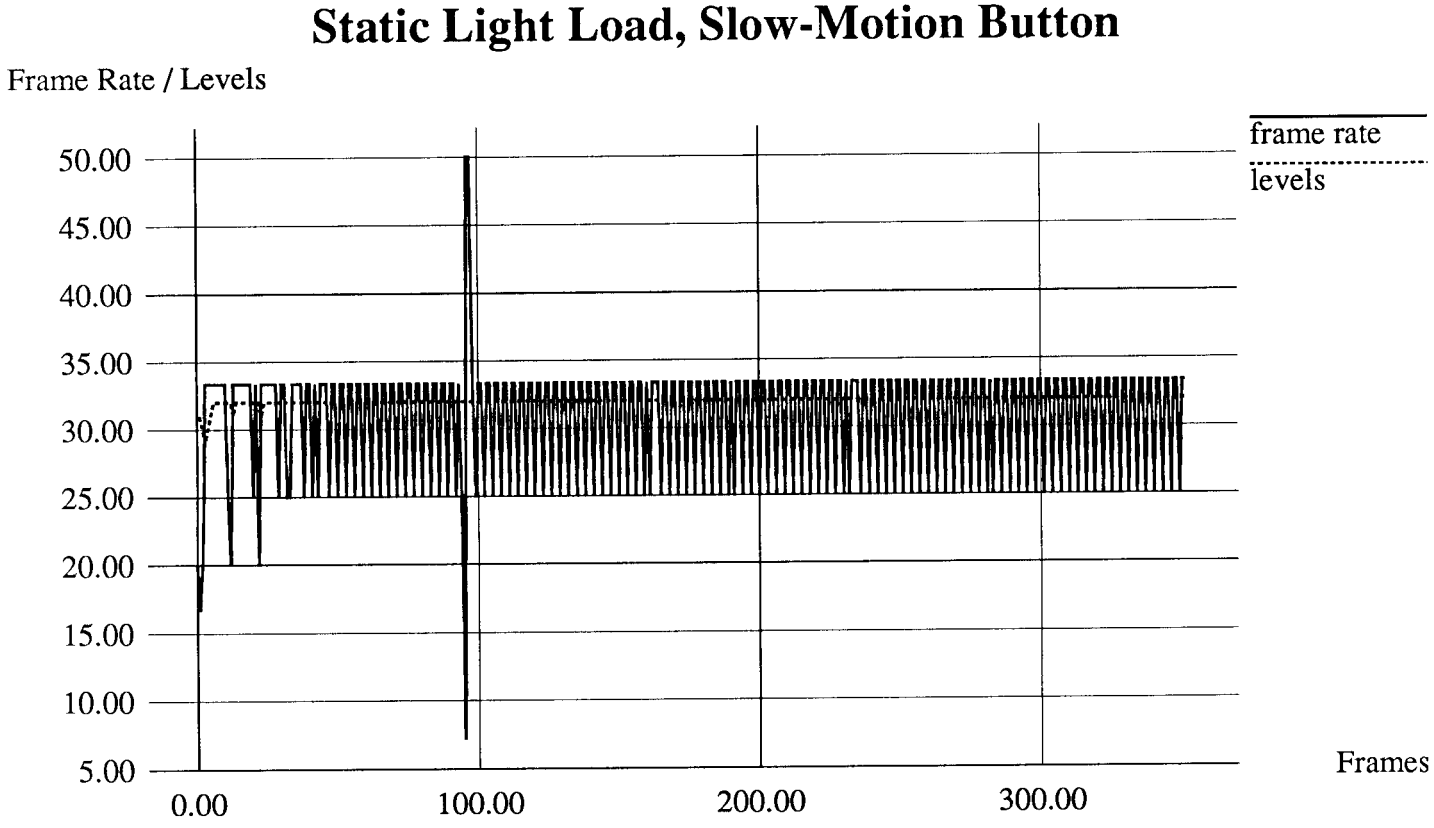

Figure 5.

Explanation: With a light load, the slow motion button has practically no effect, since the level is already around 32.

Frame Rate Data:

number of polygons in scene: 550
number of frames: 352; (approx. 17 seconds)
desired rate: 20.00
mean: 30.55 SD: 7.13
low: 7.14 high: 50.01
percentage at or above desired rate: 99.15%
percentage at or above 75% of desired rate: 99.72%

Level Data:

total possible: 32
mean: 31.97 SD: 5.66
low: 29

Static Light Load, Frame Rate = 50, Slow-Motion Button

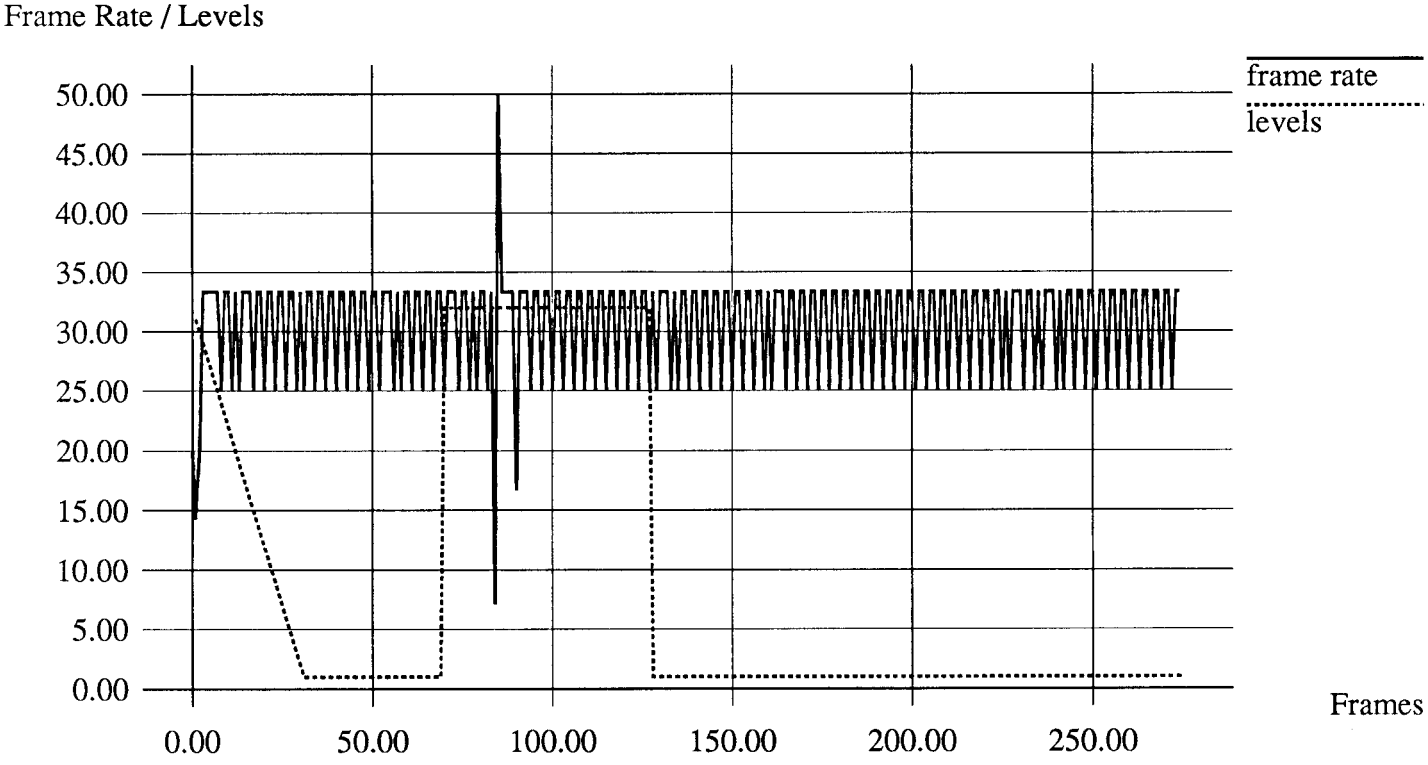

Figure 6.

Explanation: The desired frame rate is set here to an impossibly high value (50). The system cannot meet this performance level and keeps dropping the level to try to improve performance. The level bottoms out at 1 (the minimum) except when the slow motion button is pressed.

Frame Rate Data:

number of polygons in scene: 550
number of frames: 275; (approx. 5 seconds)
desired rate: 50.00
mean: 30.44 SD: 7.15
low: 7.14 high: 50.01
percentage at or above desired rate: 0.36%
percentage at or above 75% of desired rate: 0.36%

Level Data:

total possible: 32
mean: 9.23 SD: 13.36
low: 1

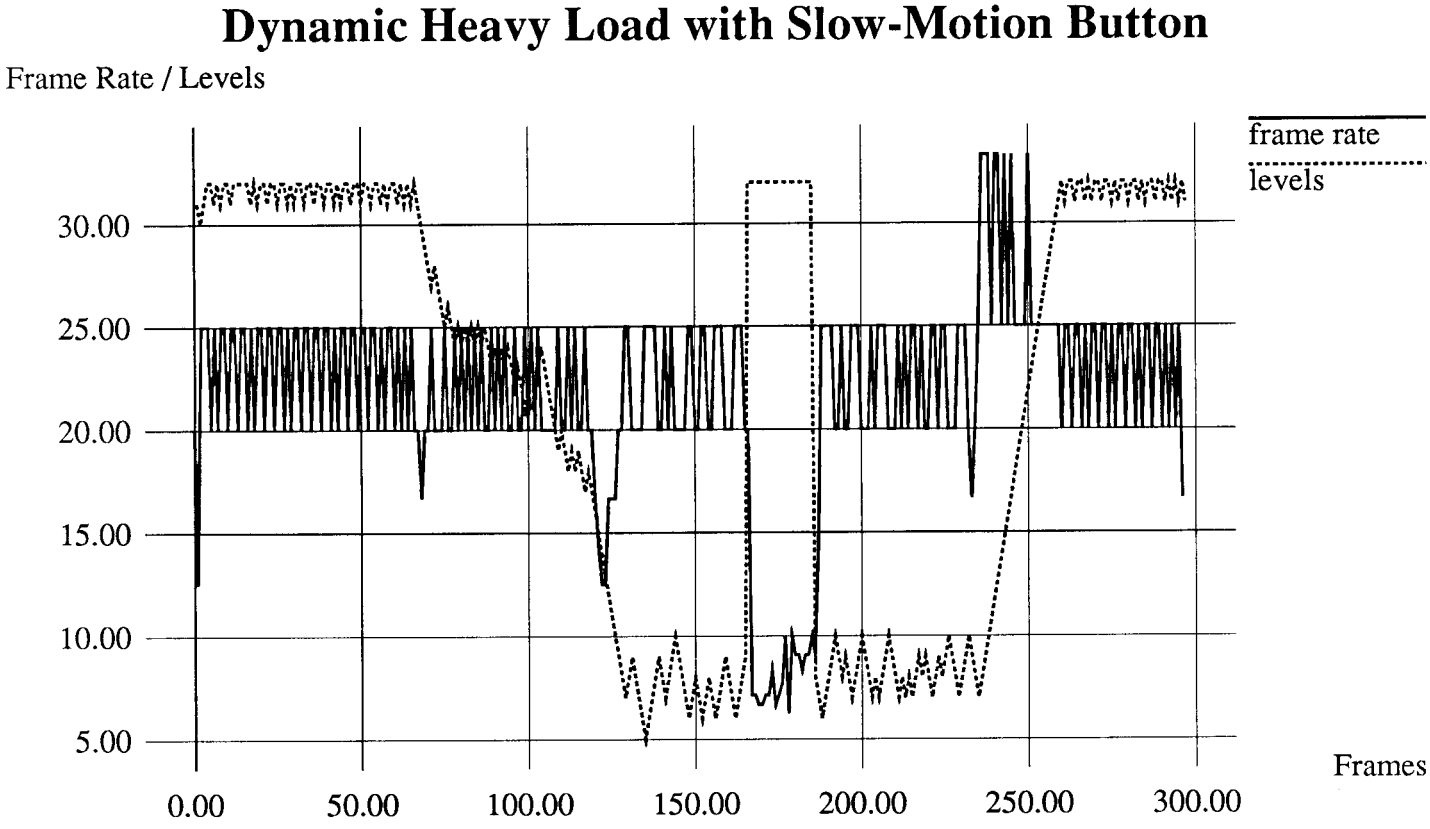

Figure 7.

Explanation: In this interactive session, the user is initially looking away from the polygon cluster, then looks at it (as the level decreases) then presses the slow motion button, then releases it, then looks away. The load and frame rate vary accordingly.

Frame Rate Data:

number of polygons in scene: 18,000
number of frames: 297; (approx. 14 seconds)
desired rate: 20.00
mean: 21.72 SD: 6.79
low: 6.25 high: 33.33
percentage at or above desired rate: 88.22%
percentage at or above 75% of desired rate: 91.58%

Level Data:

total possible: 32
mean: 21.60 SD: 11.35
low: 5

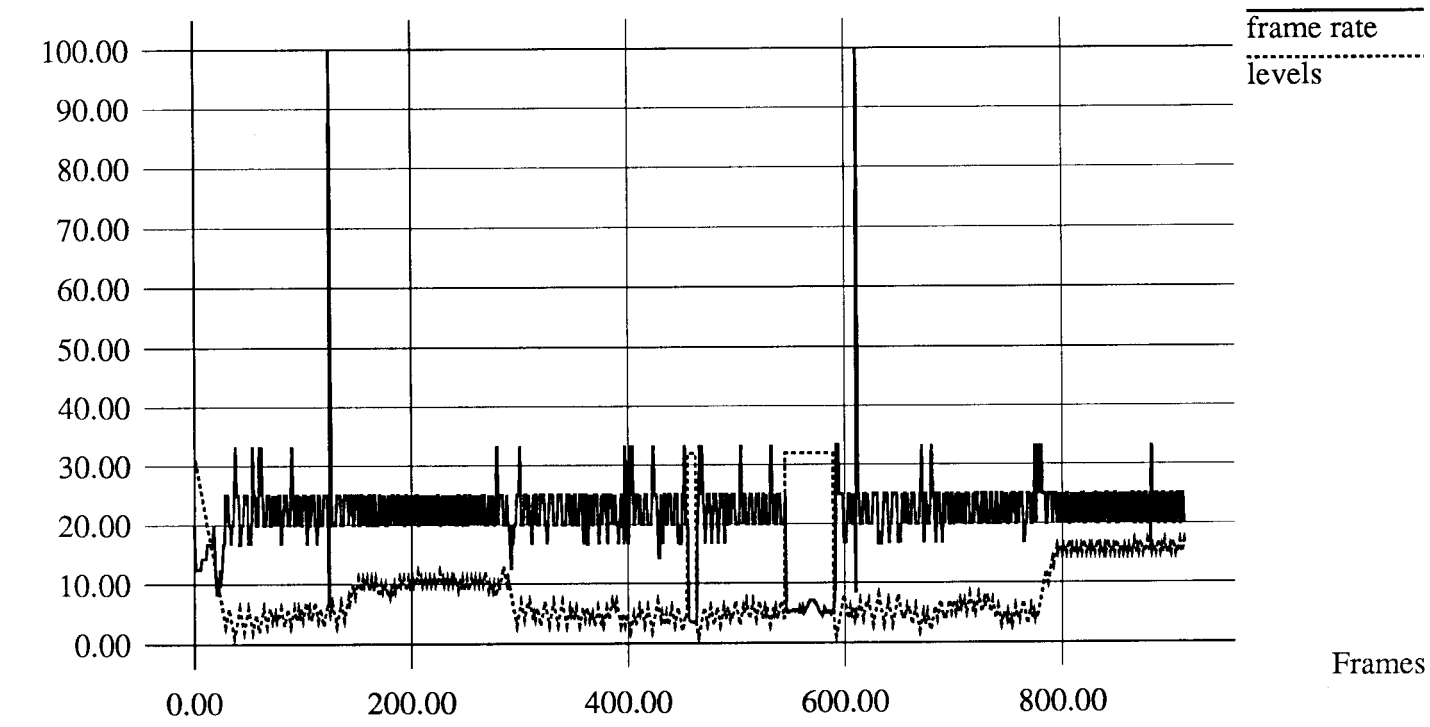

Figure 8.

Explanation: This longer session had the user actually walking around the model and using the slow motion button (once briefly at 450 frames, then again from 550 to 600 frames.) The dark stripe above the 20Hz line shows that the frame rate was usually above the requested rate.

Frame Rate Data:

number of polygons in scene: 37,000
number of frames: 913; (approx. 45 seconds)
desired rate: 20.00
mean: 21.47 SD: 8.02
low: 3.45 high: 100.02
percentage at or above desired rate: 85.87%
percentage at or above 75% of desired rate: 91.57%

Level Data:

total possible: 32
mean: 9.21 SD: 7.86
low: 1