

An MCE Technical Publication

Elevator Modernization Performance Charts

**Elevator Performance Data for Representative Buildings
Before and After Modernization with
MCE's *M3 Group System* Elevator Dispatching**

Motion Control Engineering, Incorporated

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Purpose

This Technical Publication illustrates the dramatic elevator performance improvement realized using MCE's M3 Group System. Each page summarizes actual project data.

Overview

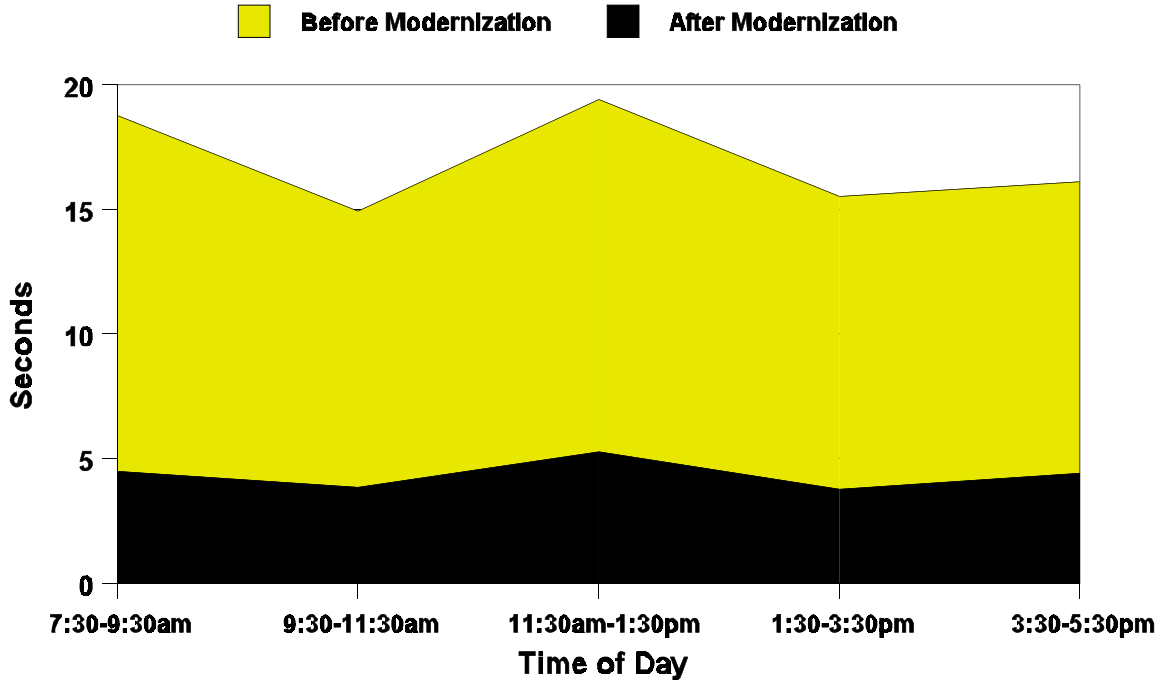
These studies document system performance improvement by comparing average waiting time, before and after modernization, for a variety of projects.

Impressive reductions in hall call waiting time have been documented *up to 83%*.

While every building is different, the following collection of individual site studies is useful as a generalized predictive model for successful elevator system improvement — as measured by reduced average waiting time — applicable to similar buildings.

The actual performance improvement resulting from a particular scope of work is obviously based on many factors including: the type of building occupancy, current population and rate of growth, the efficiency and condition of existing elevator control and dispatching equipment, and the extent of modernization undertaken.

Average Waiting Time



Equipment

Existing:

Otis gearless

Modernized with:

MCE IMC-SCR 12-pulse controls

MCE M3 Group Dispatcher

Traffic Study Detail

Pre-Modernization:

7/25/94 — Delta Traffic Analysis System

Post-Modernization:

1/27/97 — MCE CMS Traffic Analysis Reporting

Project Profile

Cars: **8**
 Floors: **11**
 Stops: **10**
 Speed: **500 fpm**
 Capacity: **3,500 lbs**
 Type: **office building**
single tenant

Statistics

	BEFORE	AFTER
Calls	3,712	4,443
Population	3,200	5,000+

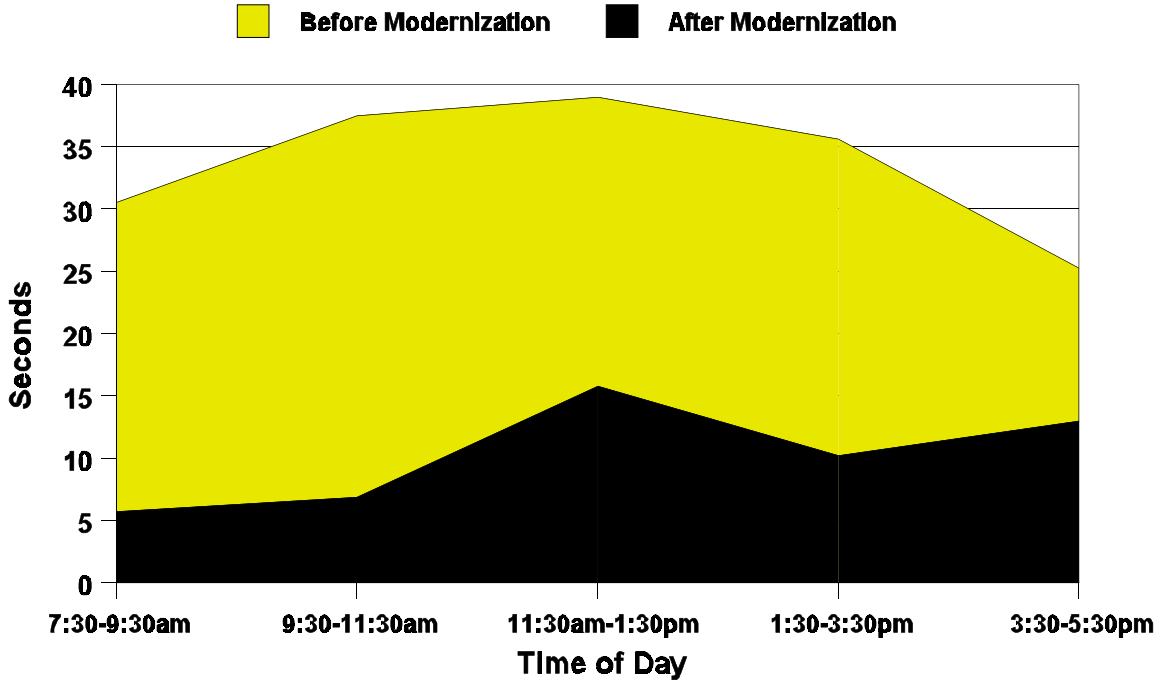


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Chase Manhattan Bank
Worldwide Headquarters — High Rise
 Manhattan, New York USA

70%
 Reduction
 in Hall Call
 Wait Time

Average Waiting Time



17 Performance Charts

Equipment

Existing:

Otis gearless

Modernized with:

MCE IMC-SCR 12-pulse controls

MCE M3 Group Dispatcher

Traffic Study Detail

Pre-Modernization:

7/25/94 — Delta Traffic Analysis System

Post-Modernization:

1/27/97 — MCE CMS Traffic Analysis Reporting

Project Profile

Cars: 8
 Floors: 52
 Stops: 21
 Speed: 1,200 fpm
 Capacity: 3,500 lbs
 Type: office building
 single tenant

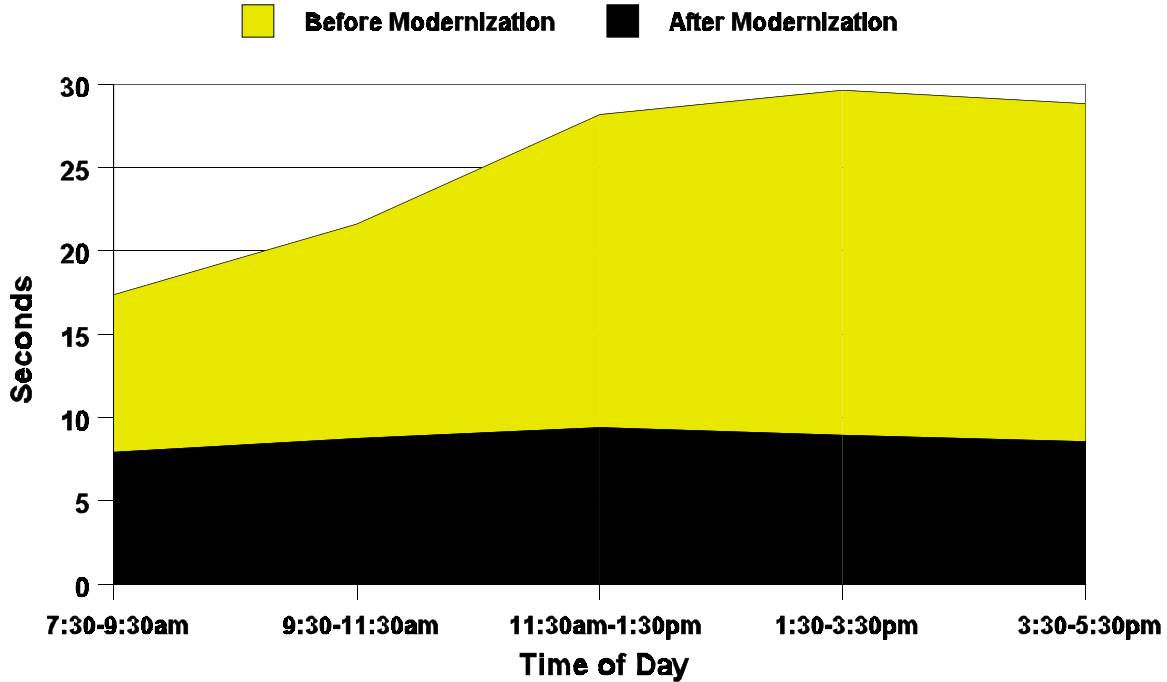
Statistics

	BEFORE	AFTER
Calls	3,130	2,496
Population	3,200	5,000+



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Average Waiting Time



Equipment

Existing:
 Westinghouse gearless
Modernized with:
 MCE IMC-SCR 12-Pulse Controls
 MCE M3 Group Dispatcher

Traffic Study Detail

Pre-Modernization:
 6/29/95 — EPTi Traffic Analysis System
Post-Modernization:
 4/9/96 — MCE Traffic Analysis Reporting

Project Profile

Cars: **4**
 Floors: **12**
 Stops: **12**
 Speed: **500 fpm**
 Capacity: **3,000 lbs**
 Type: **office building
 multiple tenant**

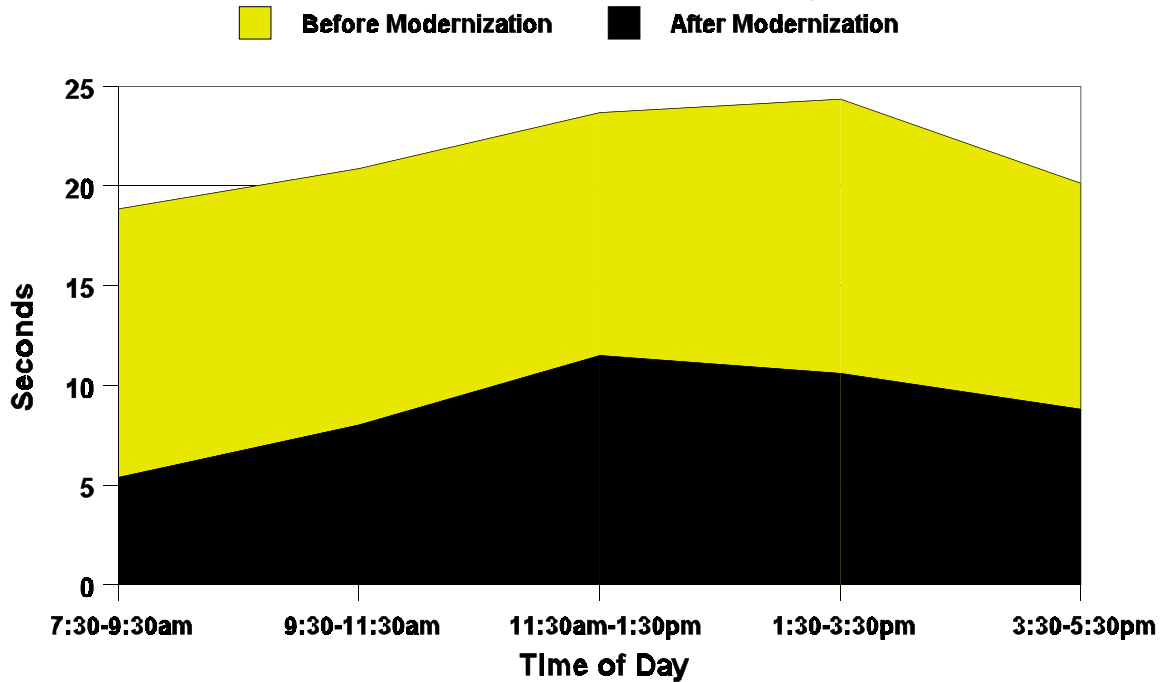
Statistics

	BEFORE	AFTER
Calls	2,413	3,258



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Average Waiting Time



Equipment

Existing:
 Otis gearless
Modernized with:
 MCE IOS Intelligent Overlay System
 MCE M3 Group Dispatcher

Project Profile

Cars: 3
 Floors: 12
 Stops: 12
 Speed: 700 fpm
 Type: office building
 multiple tenant

Traffic Study Detail

Pre-Modernization:
 11/18/91 — Digimetrix Traffic Analysis System
Post-Modernization:
 8/5/92 — MCE CMS Traffic Analysis Reporting

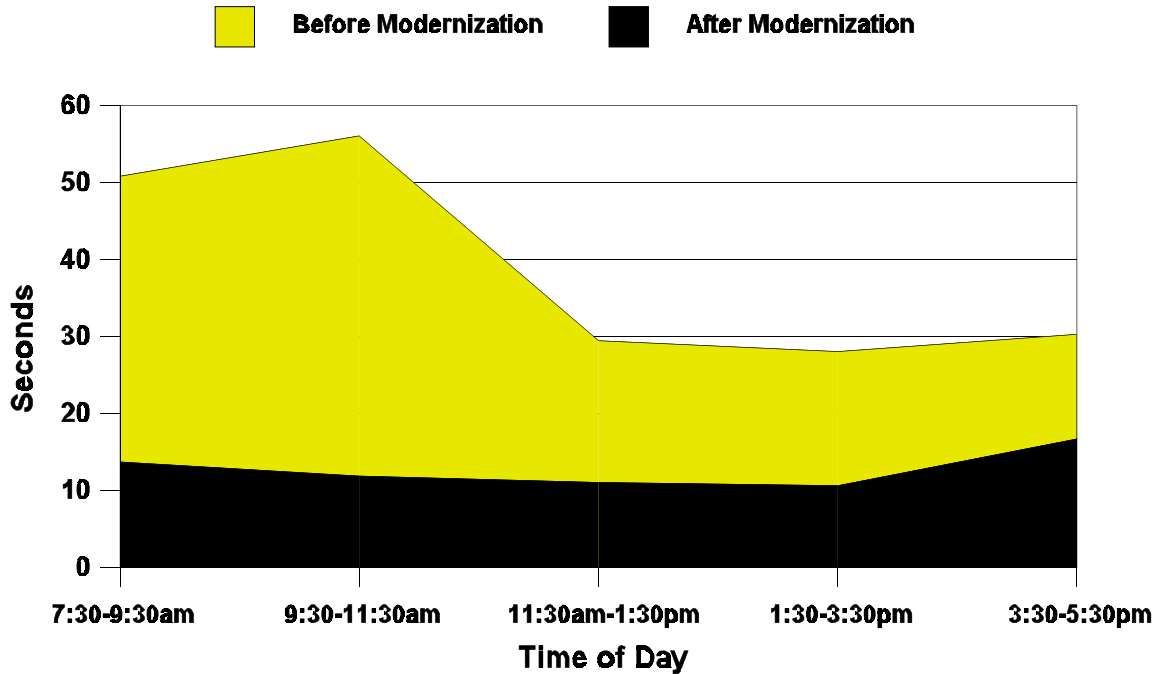
Statistics

	BEFORE	AFTER
Calls	1,712	1,739



Rev 5/26/98

Average Waiting Time



Equipment

Existing:

Otis gearless

Modernized with:

MCE IMC-SCR 12-pulse controls

MCE M3 Group Dispatcher

Project Profile

Cars: **4**
 Floors: **31**
 Stops: **31**
 Speed: **700 fpm**
 Capacity: **2,500**
 Type: **hotel**

Traffic Study Detail

Pre-Modernization:

10/29/96 — Digimetrix Traffic Analysis System

Post-Modernization:

5/4/98 — MCE CMS Traffic Analysis Reporting

Statistics

	BEFORE	AFTER
Calls	3,925	3,590

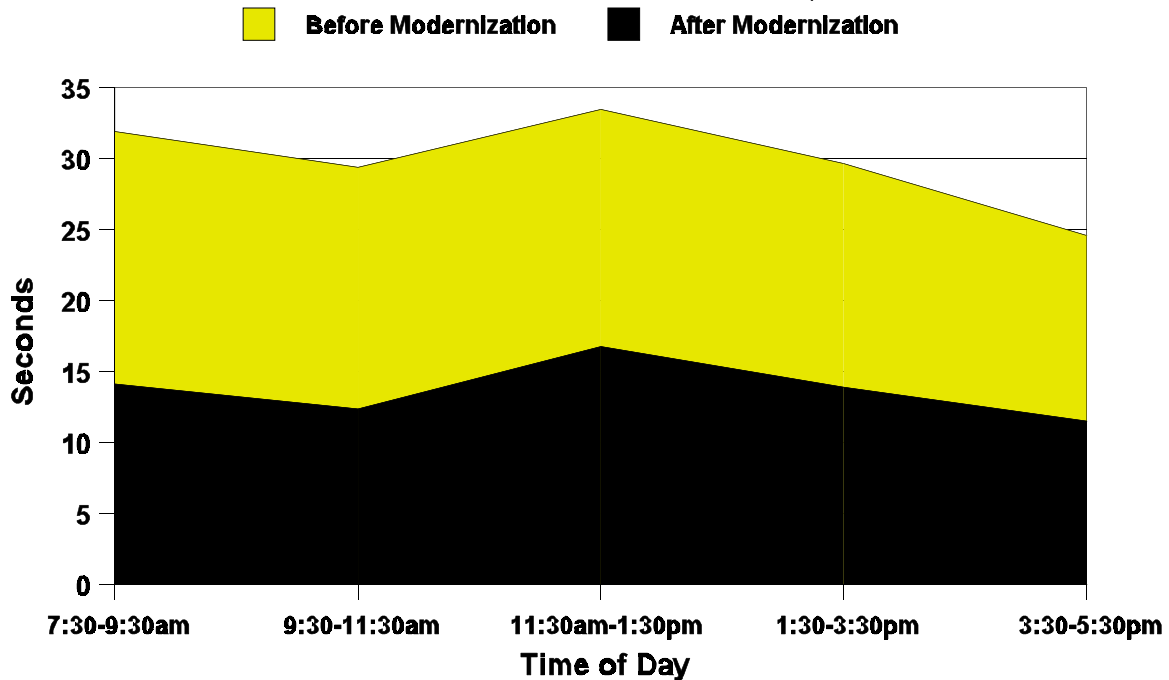


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Office Building 9
744 P Street — Low Rise
 Sacramento, California USA

54%
 Reduction
 in Hall Call
 Wait Time

Average Waiting Time



17 Performance Charts

Equipment

Existing:
 Otis gearless
Modernized with:
 MCE IMC-MG Controls
 MCE M3 Group Dispatcher

Project Profile

Cars: **3**
 Floors: **11**
 Stops: **11**
 Speed: **500 fpm**
 Capacity: **3,500 lbs**
 Type: **office building
 multiple tenant**

Traffic Study Detail

Pre-Modernization:
 5/8/97 — EPTi Traffic Analysis System
Post-Modernization:
 9/11/98 — MCE Traffic Analysis Reporting

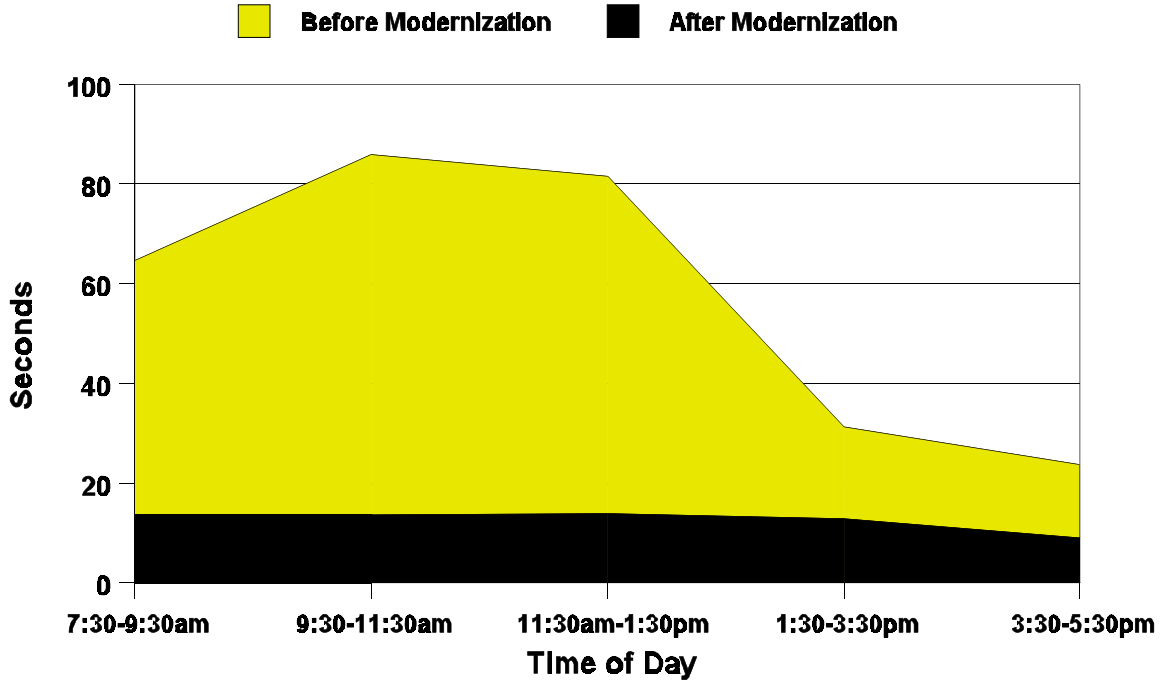
Statistics

	BEFORE	AFTER
Calls	1,852	1,995



Rev 9/17/98

Average Waiting Time



Equipment

Existing:

Otis gearless

Modernized with:

MCE IMC-MG Controls

MCE M3 Group Dispatcher

Project Profile

Cars: **3**
 Floors: **18**
 Stops: **11**
 Speed: **1,000 fpm**
 Capacity: **3,500 lbs**
 Type: **office building
 multiple tenant**

Traffic Study Detail

Pre-Modernization:

5/20/97 — EPTi Traffic Analysis System

Post-Modernization:

9/4/98 — MCE Traffic Analysis Reporting

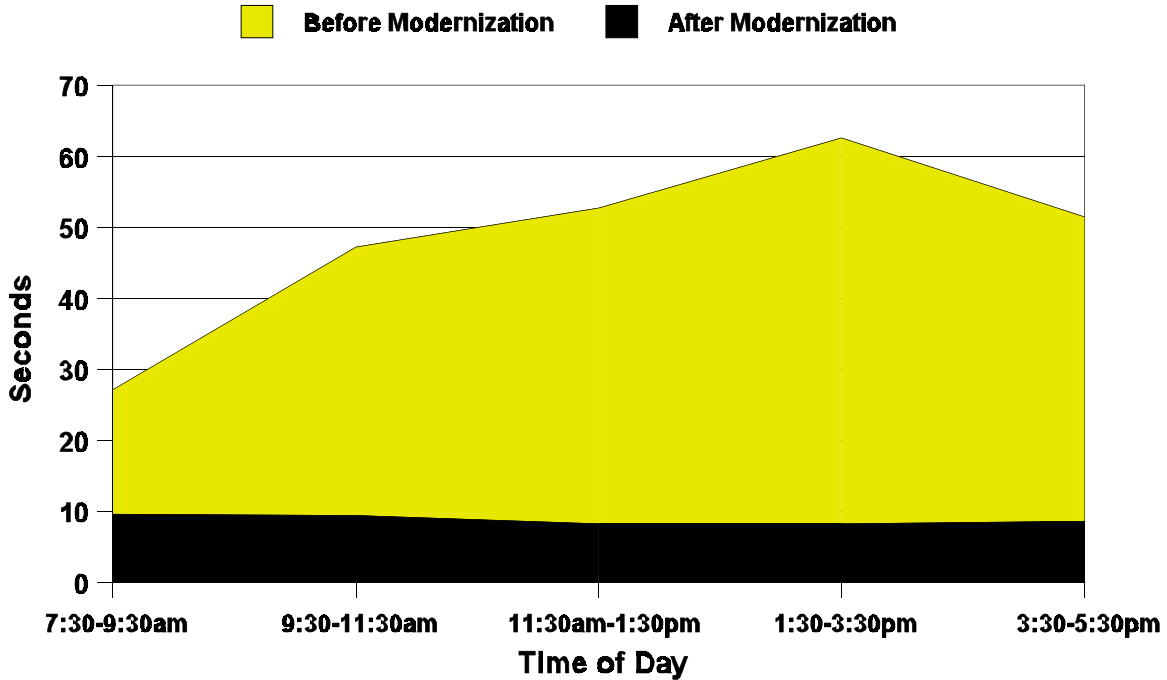
Statistics

	BEFORE	AFTER
Calls	1,607	1,792



Rev 9/10/98

Average Waiting Time



Equipment

Existing:
 Otis gearless
Modernized with:
 MCE IMC-SCR 12-Pulse Controls
 MCE M3 Group Dispatcher

Project Profile

Cars: **4**
 Floors: **13**
 Stops: **13**
 Speed: **500 fpm**
 Capacity: **3,000 lbs**
 Type: **office building
 single tenant**

Traffic Study Detail

Pre-Modernization:
 5/10/95 — EPTi Traffic Analysis Reporting
Post-Modernization:
 9/24/98 — MCE CMS Traffic Analysis Reporting

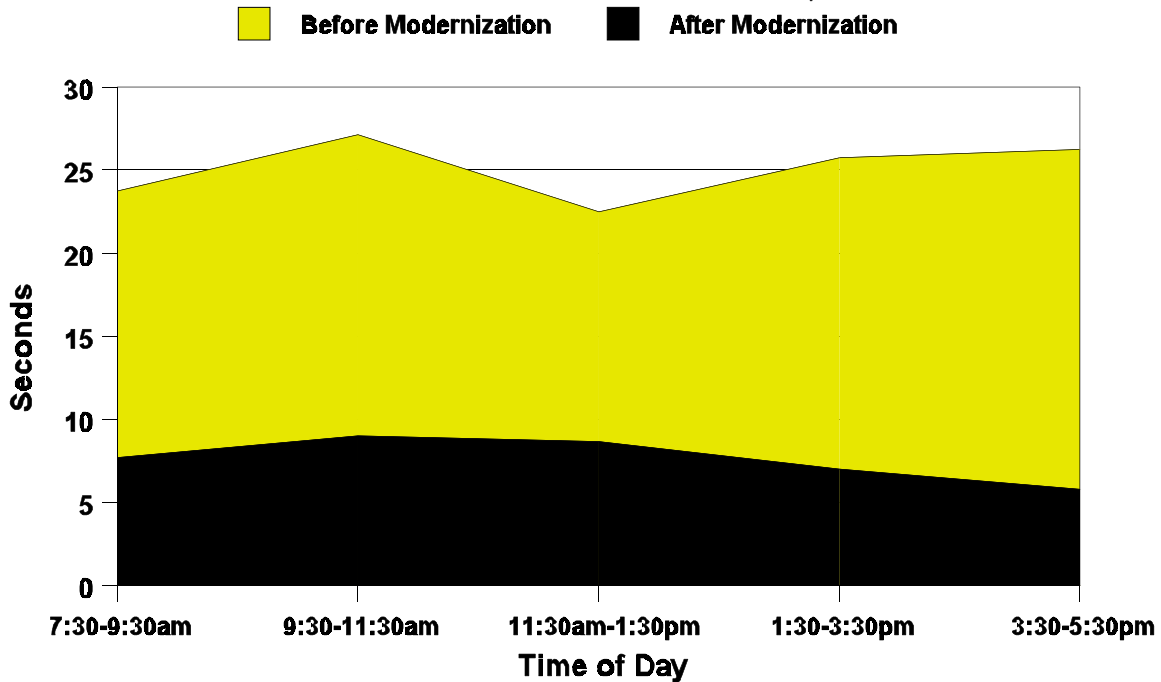
Statistics

	BEFORE	AFTER
Calls	1,900	2,536
Population	600	600



Rev 11/05/98

Average Waiting Time



Equipment

Existing:
 Westinghouse gearless
Modernized with:
 MCE IMC-SCR 12-pulse controls
 MCE M3 Group Dispatcher

Project Profile

Cars: **6**
 Floors: **19**
 Stops: **18**
 Speed: **700 fpm**
 Capacity: **4,000 lbs**
 Type: **medical school**

Traffic Study Detail

Pre-Modernization:
 3/19/96 — Digimetrix Traffic Analysis System
Post-Modernization:
 3/18/97 — Digimetrix Traffic Analysis System

Statistics

	BEFORE	AFTER
Calls	2,203	3,422



Rev 5/26/98

About the M3 Group System

The *M3 Group System* is one of the industry's most advanced multi-car group dispatching systems, using a powerful 32-bit RISC processor to perform real-time evaluation and analysis of building traffic in order to minimize waiting time.

MCE software engineers developed mathematical models, using sequencing and queuing theory, to reduce the time required to serve each elevator call.

The *M3 Group System* compiles the required physical and statistical information, considers various parameters, then applies minimization algorithms in order to select the elevator car best suited to respond to each hall demand.

The *M3* dispatching algorithm considers parameters including:

- Car position
- Car direction
- Car mode – automatic, inspection, independent, earthquake, fire service
- Car motion status (acceleration, high speed, deceleration)
- Car parking status (lobby/non-lobby)
- Anticipated direction of motion
- Door status (open, opening, closed, closing)
- Door opening time
- Door closing time
- Number of car calls
- Number of stops ahead
- Assigned hall calls
- Coincidence calls
- Load weigher status (if applicable)
- Program mode (balanced, peak)
- Late hall call threshold (per hall call, per direction)
- Number of cars in service

Lobby functions, parking floors and dispatching configurations are user defined.

Unprecedented flexibility allows the system to be adapted to the unique demands of a particular building population. This same flexibility allows the system to be reconfigured for changing building populations and conditions as well.