
EXAMPLE 1

Office Building

Up Peak

Discussion

This example demonstrates the use of **Elevate** to analyse the morning incoming up peak in an office building. To load the Elevate document select **File, Open** and then **Example 1a.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.) Repeat to open **Example 1b.elv**, **Example 1c.elv**, and **Example 1d.elv**.

The building under consideration has a ground floor plus 8 upper floors. The interfloor distance is 3.5m except for the ground floor, which is 5m high. The population is 80 persons per floor. A **Stair Factor** of 50% has been used to make an allowance for people using the stairs.

The client has specified a 5 minute handling capacity of 15%, and a maximum interval of 30 seconds.

Example 1a.elv shows the **Enhanced up peak Analysis type** being used to search a range of possible configurations to find a solution. The lowest specification to meet the design criteria is 4 No 1000 kg elevators @ 1.6 m/s.

Example 1b.elv shows that the **General analysis** gives very similar results for the same input.

If the **Analysis type** is **General analysis** or **Simulation**, you can analyse more complex scenarios:

Example 1c.elv shows the same building, but this time with a basement car park floor. The total handling capacity is still 15%, but some of the passengers are now arriving at the parking floor.

Example 1d is a **Simulation** of the previous example. The client can now be given an indication of passenger waiting and transit times. In this instance, the Group Collective dispatcher in Up peak 2 mode performs best.

Example 1e is a **Simulation** using Destination Dispatch. Note that in this example the average waiting time is longer than in 1d, but that the overall journey time is faster.

Example 1f is a **Simulation** based on the original example without a basement floor. An up peak profile is being applied such that the traffic starts quiet, rises to the peak for just five minutes, and then falls again. Note that the nominal peak is 15%, but that because of the stair factor, the “measured” passenger demand peaks below 15%.

ANALYSIS DATA

Analysis Type Enhanced up peak calculation
Measurement system Metric
Losses (%) 5.00

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	SELECT	Min: 2	Max: 6
Capacity (kg)	SELECT	Min: 1000	Max: 1600
Door Pre-opening Time (s)	AUTO		
Door Open Time (s)	AUTO		
Door Close Time (s)	AUTO		
Speed (m/s)	SPECIFIED	1.60	
Acceleration (m/s ²)	AUTO		
Jerk (m/s ³)	AUTO		
Start Delay (s)	0.50		

PASSENGER DATA

Loading Time (s) 1.20
Unloading Time (s) 1.20
Passenger Mass (kg) 75
Stair Factor (%) 50.00
Arrival Rate as % building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Ground				15.00
Level 1	80			
Level 2	80			
Level 3	80			
Level 4	80			
Level 5	80			
Level 6	80			
Level 7	80			
Level 8	80			

ENHANCED UP PEAK CALCULATION RESULTS (SUMMARY)

discarding results where interval is greater than 30.0s
discarding results where capacity factor is greater than 80.0s

No. of Elevators	Speed (m/s)	Acceln (m/s ²)	Jerk (m/s ³)	Elevator Capacity (kg)	Door Type	Door Times Pre-Open, Open, Close (s)	Prob No of Stops	Highest Reversal Floor	Interval (s)	Capacity Factor (%)
4	1.60	0.70	1.40	1000	CO 1100mm	0.00, 1.80, 2.90	5.0	7.6	26.3	56.7
4	1.60	0.70	1.40	1250	CO 1100mm	0.00, 1.80, 2.90	5.0	7.6	26.3	46.1
4	1.60	0.70	1.40	1600	CO 1100mm	0.00, 1.80, 2.90	5.0	7.6	26.3	35.2
5	1.60	0.70	1.40	1000	CO 1100mm	0.00, 1.80, 2.90	3.8	7.3	17.7	38.1
5	1.60	0.70	1.40	1250	CO 1100mm	0.00, 1.80, 2.90	3.8	7.3	17.7	31.0
5	1.60	0.70	1.40	1600	CO 1100mm	0.00, 1.80, 2.90	3.8	7.3	17.7	23.6
6	1.60	0.70	1.40	1000	CO 1100mm	0.00, 1.80, 2.90	3.0	6.9	12.7	27.4
6	1.60	0.70	1.40	1250	CO 1100mm	0.00, 1.80, 2.90	3.0	6.9	12.7	22.3
6	1.60	0.70	1.40	1600	CO 1100mm	0.00, 1.80, 2.90	3.0	6.9	12.7	17.0

ANALYSIS DATA

Analysis Type	General analysis
Measurement system	Metric
Losses (%)	5.00

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	SPECIFIED	4
Capacity (kg)	SPECIFIED	1000
Door Pre-opening Time (s)	AUTO	
Door Open Time (s)	AUTO	
Door Close Time (s)	AUTO	
Speed (m/s)	SPECIFIED	1.60
Acceleration (m/s ²)	AUTO	
Jerk (m/s ³)	AUTO	
Start Delay (s)	0.50	
Home Floor	Ground	

PASSENGER DATA

Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Stair Factor (%)	50.00
Arrival Rate as	% building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Ground	0			15.00
Level 1	80			0.00
Level 2	80			0.00
Level 3	80			0.00
Level 4	80			0.00
Level 5	80			0.00
Level 6	80			0.00
Level 7	80			0.00
Level 8	80			0.00

GENERAL ANALYSIS RESULTS (SUMMARY)

discarding results where interval is greater than 30.0s

discarding results where capacity factor is greater than 80.0s

<i>No. of Elevators</i>	<i>Speed (m/s)</i>	<i>Acceln (m/s²)</i>	<i>Jerk (m/s³)</i>	<i>Elevator Capacity (kg)</i>	<i>Door Type</i>	<i>Door Times Pre-Open, Open, Close (s)</i>	<i>Prob No of Stops</i>	<i>Lowest Reversal Floor</i>	<i>Highest Reversal Floor</i>	<i>Interval (s)</i>	<i>Capacity Factor (%)</i>
4	1.60	0.70	1.40	1000	CO 1100mm	0.00, 1.80, 2.90	5.7	1.0	8.4	25.3	54.5

ANALYSIS DATA

Analysis Type	General analysis
Measurement system	Metric
Losses (%)	5.00

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Car Park	3.30
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	SPECIFIED	4
Capacity (kg)	SPECIFIED	1000
Door Pre-opening Time (s)	AUTO	
Door Open Time (s)	AUTO	
Door Close Time (s)	AUTO	
Speed (m/s)	SPECIFIED	1.60
Acceleration (m/s ²)	AUTO	
Jerk (m/s ³)	AUTO	
Start Delay (s)	0.50	
Home Floor	Ground	

PASSENGER DATA

Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Stair Factor (%)	50.00
Arrival Rate as	% building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Car Park	0			1.00
Ground	0			14.00
Level 1	80			0.00
Level 2	80			0.00
Level 3	80			0.00
Level 4	80			0.00
Level 5	80			0.00
Level 6	80			0.00
Level 7	80			0.00
Level 8	80			0.00

GENERAL ANALYSIS RESULTS (SUMMARY)

<i>No. of Elevators</i>	<i>Speed (m/s)</i>	<i>Acceln (m/s²)</i>	<i>Jerk (m/s³)</i>	<i>Elevator Capacity (kg)</i>	<i>Door Type</i>	<i>Door Times Pre-Open, Open, Close (s)</i>	<i>Prob No of Stops</i>	<i>Lowest Reversal Floor</i>	<i>Highest Reversal Floor</i>	<i>Interval (s)</i>	<i>Capacity Factor (%)</i>
4	1.60	0.70	1.40	1000	CO 1100mm	0.00, 1.80, 2.90	6.4	1.6	9.5	27.9	60.2

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Group Collective Traffic mode: Up peak 2
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
Random number seed for passenger generator	1

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Car Park	3.30
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	4
Capacity (kg)	1000
Door Pre-opening Time (s)	0.00
Door Open Time (s)	1.80
Door Close Time (s)	2.90
Speed (m/s)	1.60
Acceleration (m/s ²)	0.70
Jerk (m/s ³)	1.40
Start Delay (s)	0.50
Home Floor	Ground

PASSENGER DATA

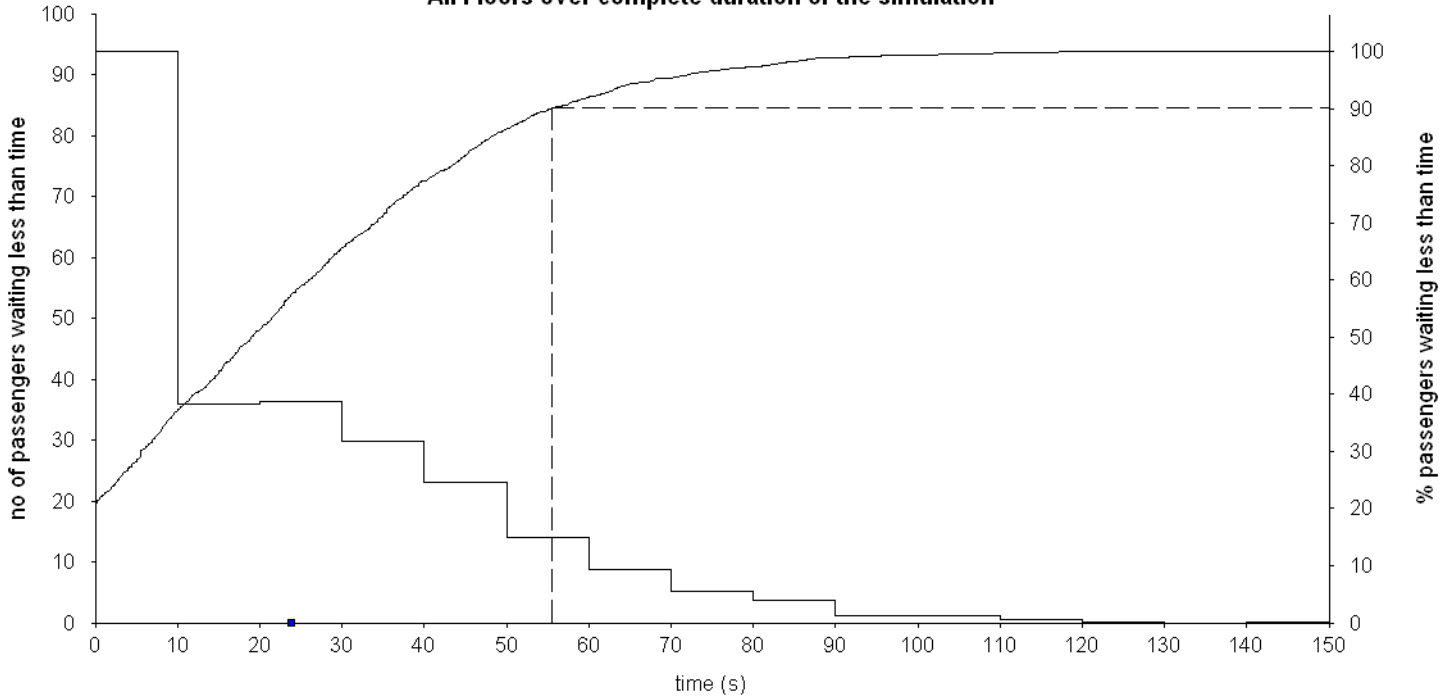
Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Capacity Factor (%)	80.00
Stair Factor (%)	50.00
Start Time (hrs:mins)	09:00
End Time (hrs:mins)	09:15
Arrival Rate as	% building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Car Park	0			1.00
Ground	0			14.00
Level 1	80			0.00
Level 2	80			0.00
Level 3	80			0.00
Level 4	80			0.00
Level 5	80			0.00
Level 6	80			0.00
Level 7	80			0.00
Level 8	80			0.00

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Passenger Waiting Times

All Floors over complete duration of the simulation

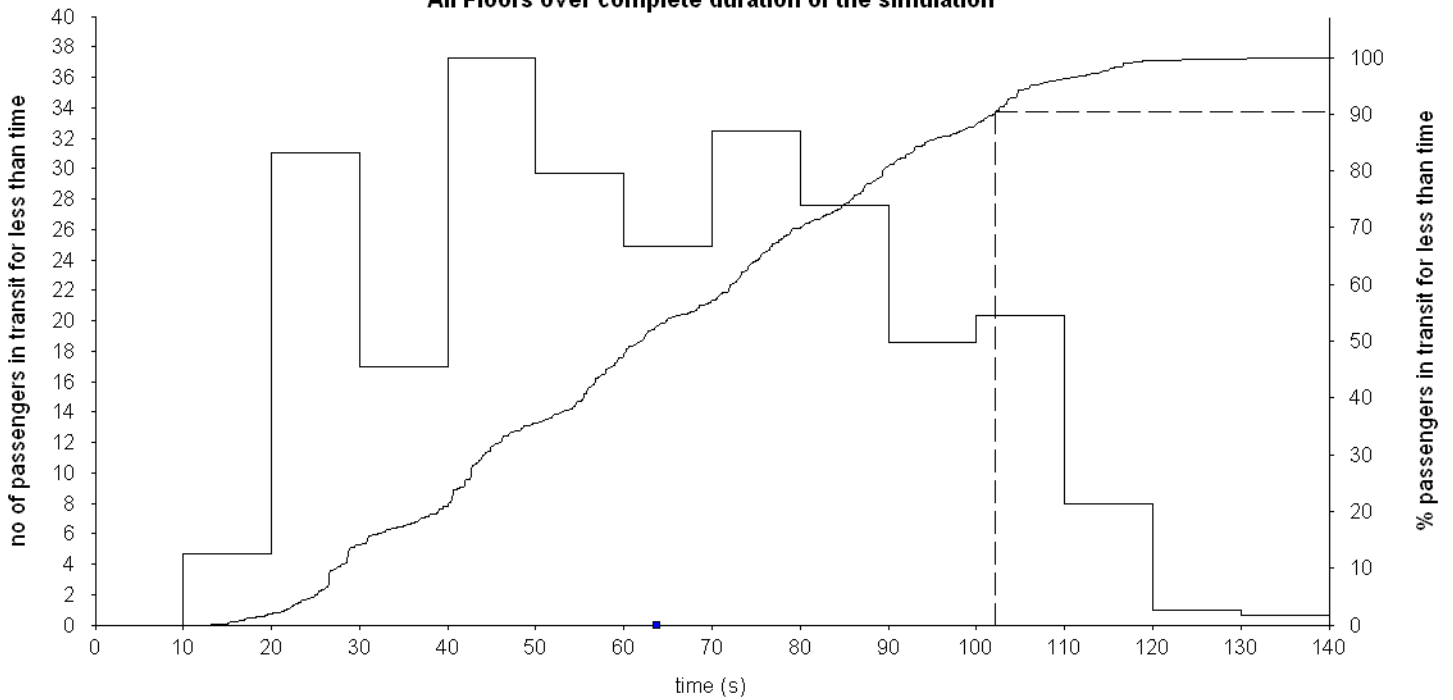


Average Waiting Time (s) 23.9 (+13.1/-9.4)
Longest Waiting Time (s) 92.6 (+55.6/-29.8)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Passenger Transit Times

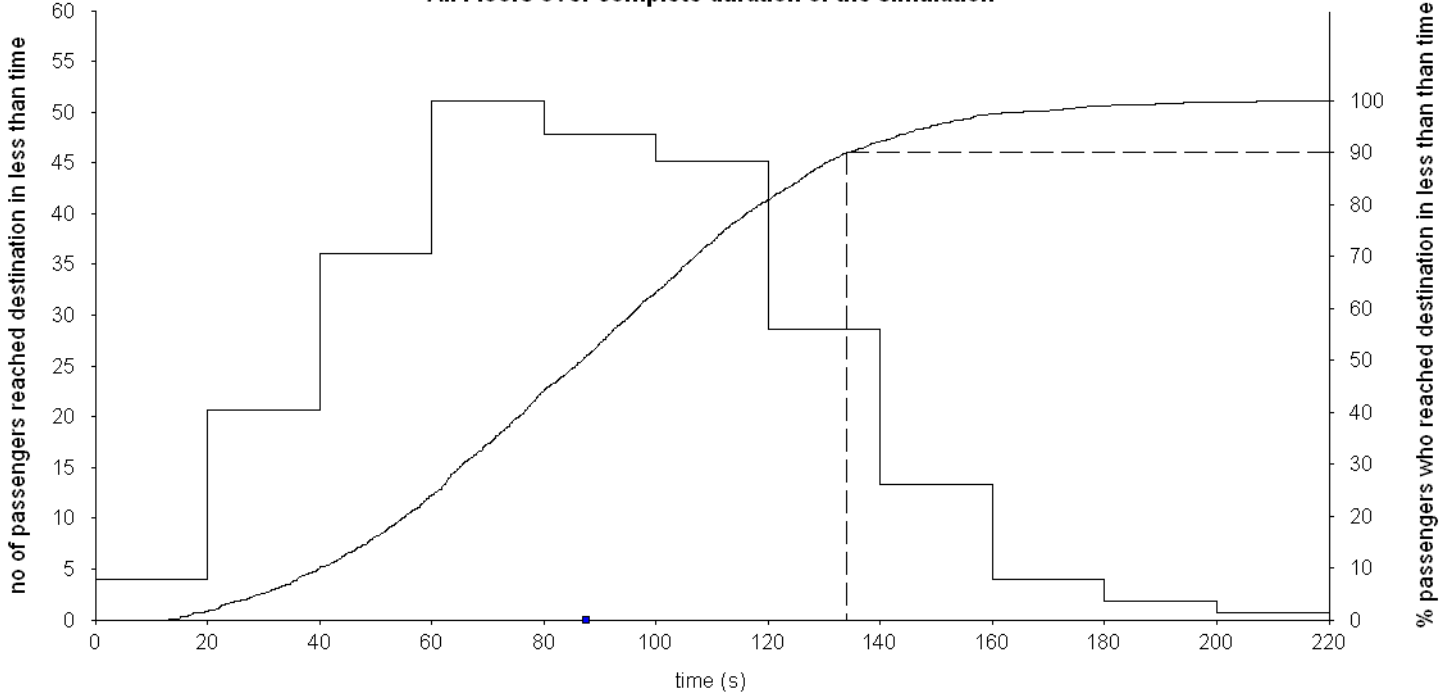
All Floors over complete duration of the simulation



Average Transit Time (s) 63.7 (+3.2/-2.6)
Longest Transit Time (s) 128.0 (+9.1/-11.5)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Time to Destination All Floors over complete duration of the simulation



Average Time To Destination (s) 87.6 (+13.5/-12.0)
Longest Time to Destination (s) 186.0 (+26.6/-28.1)

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Destination Dispatch (ACA)
Cost Function	Minimum journey time
Reduction in number of stops penalty	0.0
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
Random number seed for passenger generator	1

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Car Park	3.30
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	4
Capacity (kg)	1000
Door Pre-opening Time (s)	0.00
Door Open Time (s)	1.80
Door Close Time (s)	2.90
Speed (m/s)	1.60
Acceleration (m/s ²)	0.70
Jerk (m/s ³)	1.40
Start Delay (s)	0.50
Home Floor	Ground

PASSENGER DATA

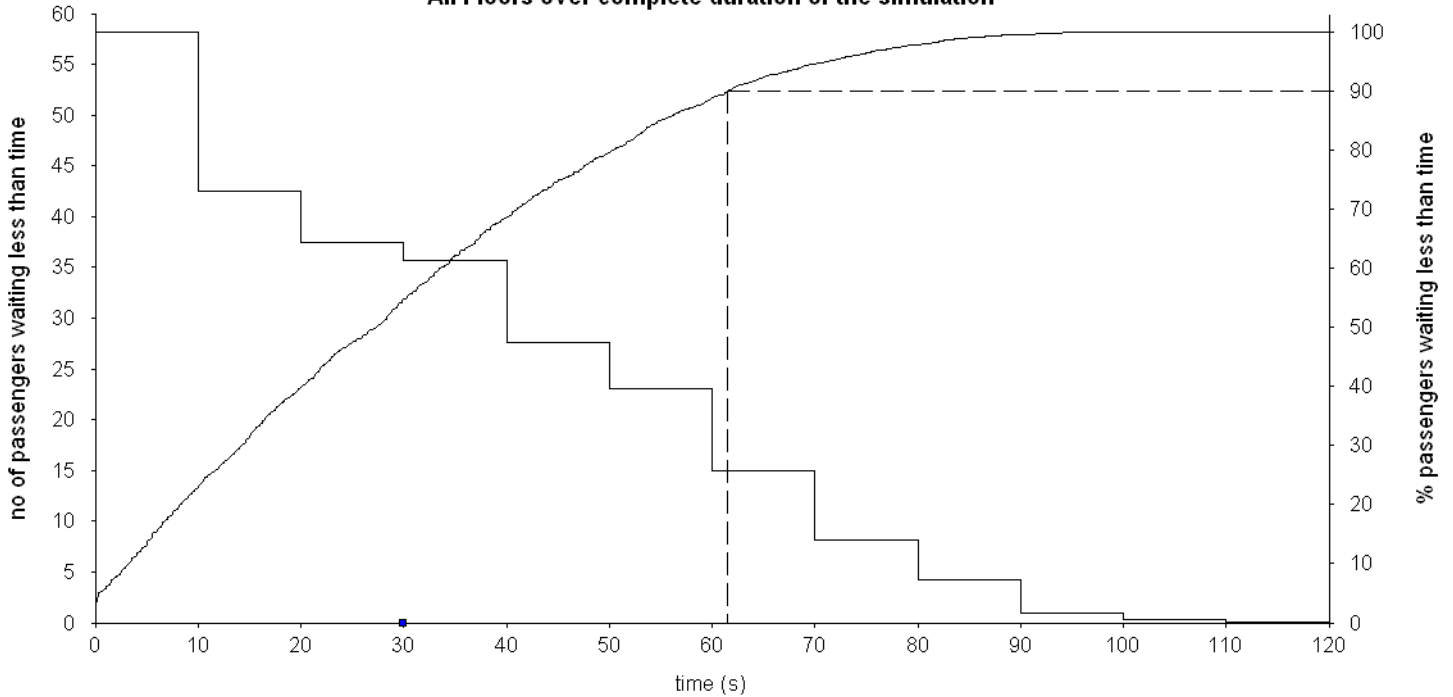
Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Capacity Factor (%)	80.00
Stair Factor (%)	50.00
Start Time (hrs:mins)	09:00
End Time (hrs:mins)	09:15
Arrival Rate as	% building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Car Park	0			1.00
Ground	0			14.00
Level 1	80			0.00
Level 2	80			0.00
Level 3	80			0.00
Level 4	80			0.00
Level 5	80			0.00
Level 6	80			0.00
Level 7	80			0.00
Level 8	80			0.00

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Passenger Waiting Times

All Floors over complete duration of the simulation

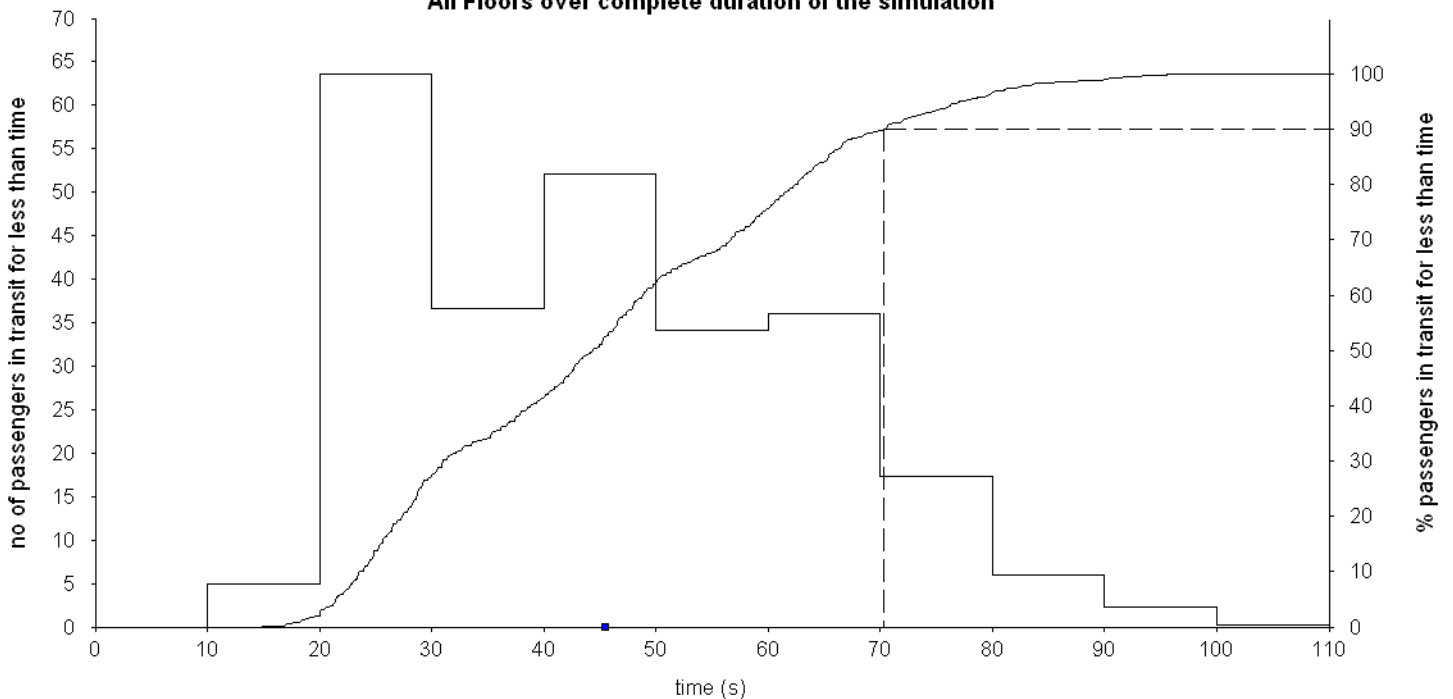


Average Waiting Time (s) 30.0 (+2.7/-3.3)
Longest Waiting Time (s) 92.3 (+18.4/-16.5)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Passenger Transit Times

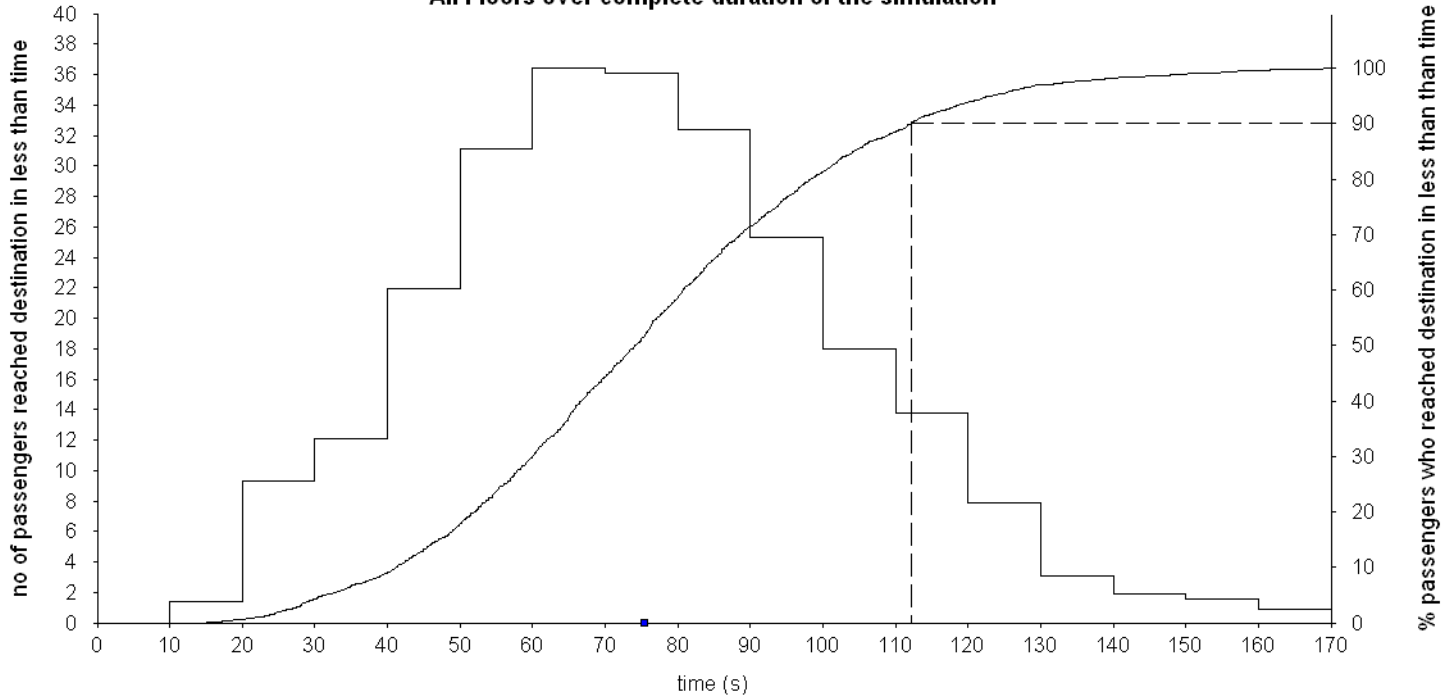
All Floors over complete duration of the simulation



Average Transit Time (s) 45.6 (+2.5/-2.5)
Longest Transit Time (s) 93.9 (+10.8/-6.0)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Time to Destination All Floors over complete duration of the simulation



Average Time To Destination (s) 75.6 (+5.2/-5.7)
Longest Time to Destination (s) 159.2 (+10.5/-11.1)

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Group Collective Traffic mode: Up peak 1
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
Random number seed for passenger generator	1

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	4
Capacity (kg)	1000
Door Pre-opening Time (s)	0.00
Door Open Time (s)	1.80
Door Close Time (s)	2.90
Speed (m/s)	1.60
Acceleration (m/s ²)	0.70
Jerk (m/s ³)	1.40
Start Delay (s)	0.50
Home Floor	Ground

PASSENGER DATA

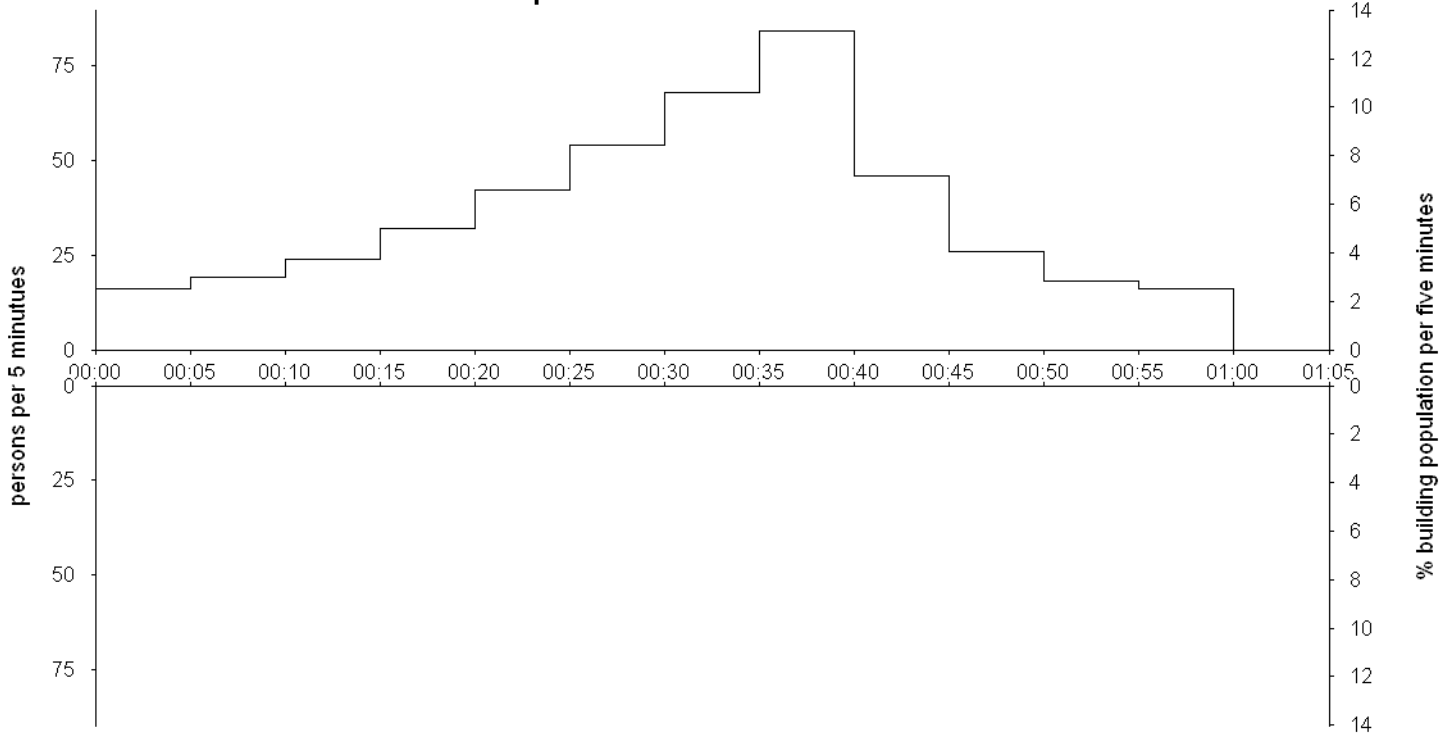
Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Capacity Factor (%)	80.00
Stair Factor (%)	50.00
Arrival Rate as	Barney one hour up peak template with peak 15.0 % building pop/5min handling capacity

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>
Ground	0		
Level 1	80		
Level 2	80		
Level 3	80		
Level 4	80		
Level 5	80		
Level 6	80		
Level 7	80		
Level 8	80		

4 No. 1000 kg elevators @ 1.60 m/s
 Average of all runs

Passenger Demand

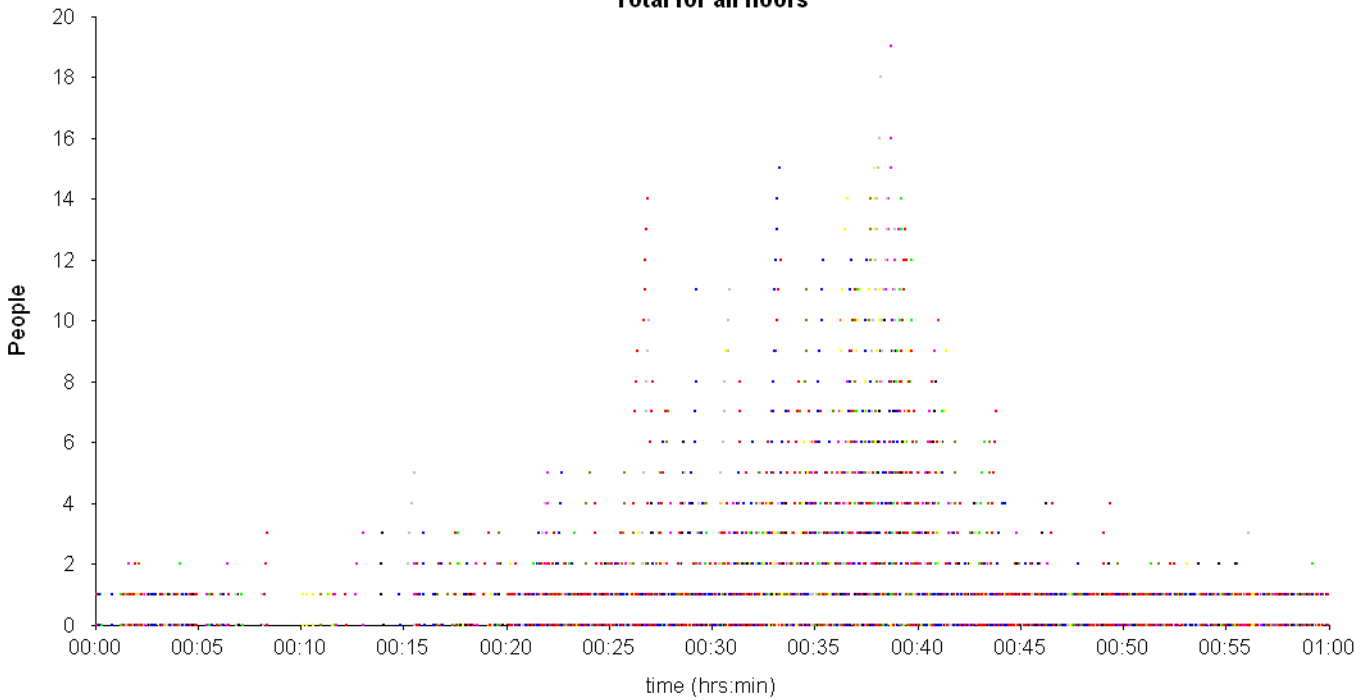
Total Up/Down Traffic - solid line above/below



4 No. 1000 kg elevators @ 1.60 m/s
 Average of all runs

Queue Lengths

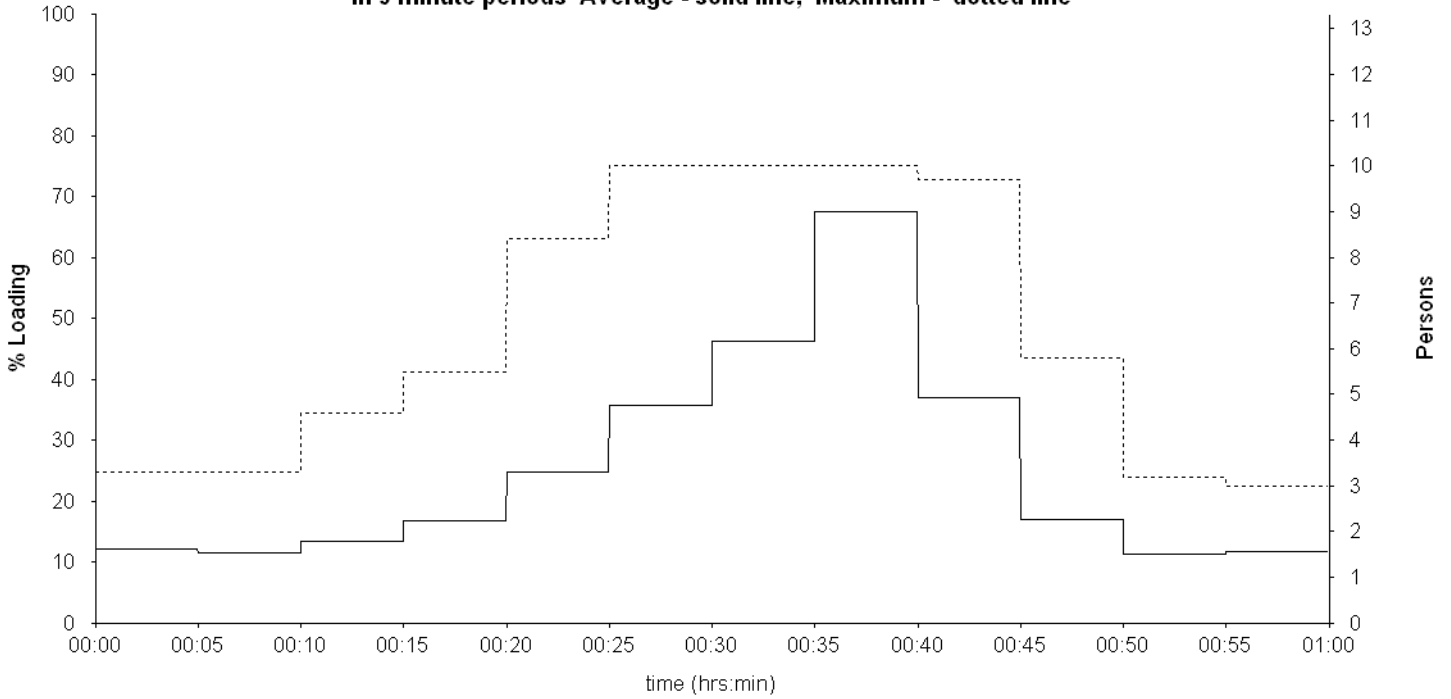
Total for all floors



No average of Queue Length so results for all runs plotted together

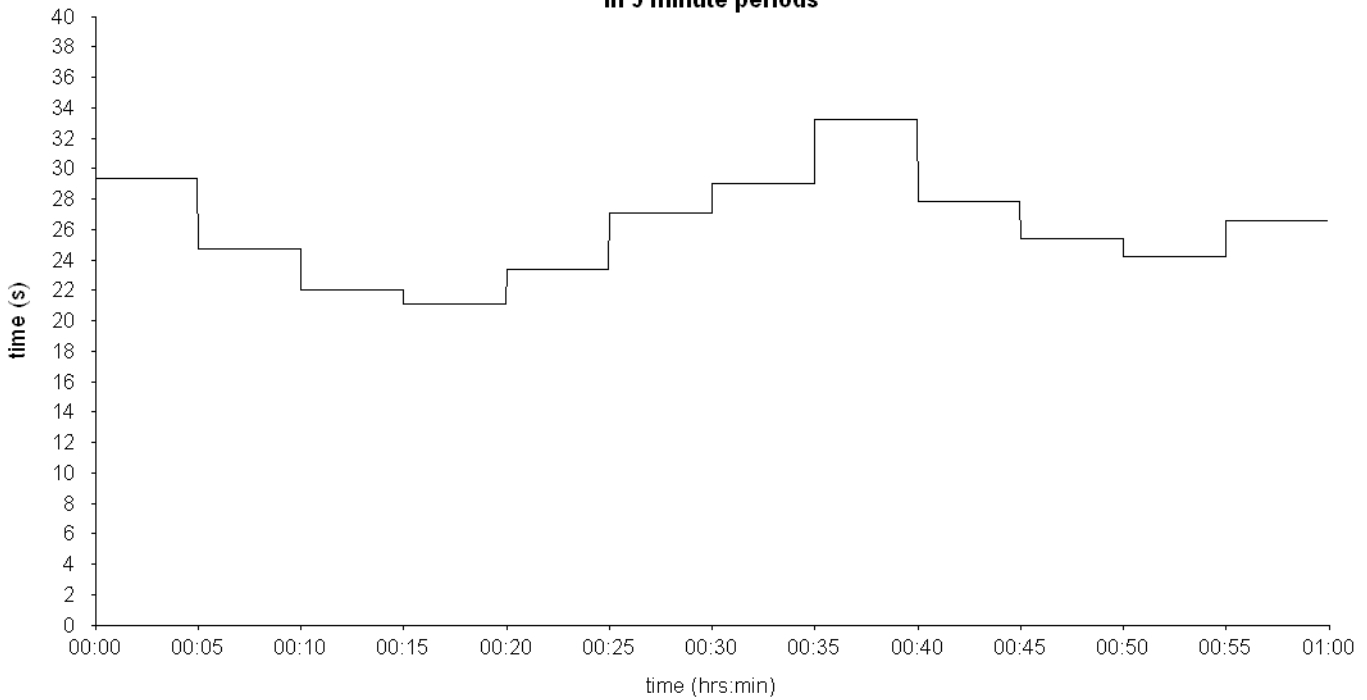
4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Car Loading on Departure from Home Floor in 5 minute periods Average - solid line, Maximum - dotted line



4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Dispatch Interval from Home Floor in 5 minute periods

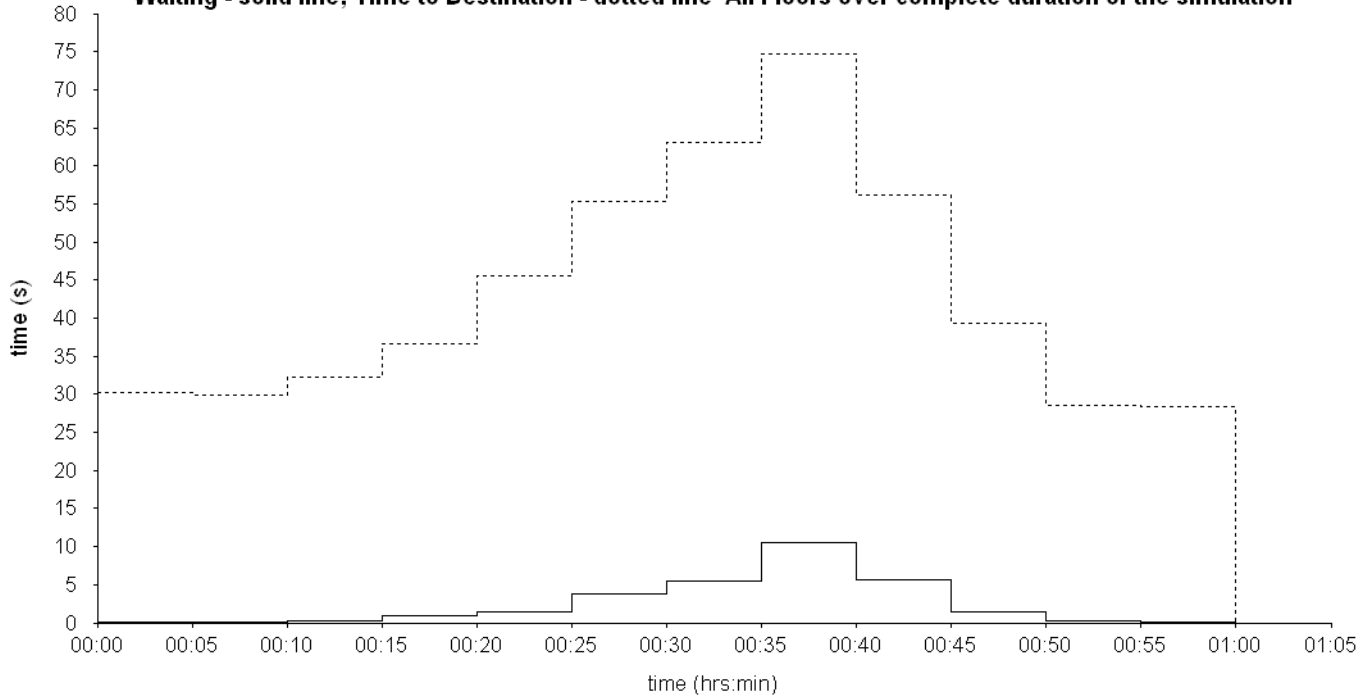


Average Interval 25.4 s (+1.3/-2.1)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Average Waiting and Time to Destination

Waiting - solid line; Time to Destination - dotted line All Floors over complete duration of the simulation



Office Building Lunch Peak

Discussion

This example demonstrates the use of **Elevate** to analyse the lunch time peak in an office building. To load the Elevate document select **File, Open** and then **Example 2a.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.) Repeat to open **Example 2b.elv**.

The required handling capacity is 15% of the building population per 5 minutes. This traffic is split into three parts: 40% up the building, 4% down the building, and 20% travelling interfloor.

Example 2a provides an analysis of the traffic using the **General analysis**. The **General analysis** is a round trip time calculation, so calculates results including the **Interval**.

Example 2b provides an analysis using **Simulation**. Calculated results include **Average Passenger Waiting Time** and **Average Passenger Transit Time**.

If, for example, there was a staff canteen on the top floor the traffic flow would be more complex, but could still be entered into **Elevate** using arrival rates and destination probabilities.

GENERAL ANALYSIS RESULTS (4 No. 1000 kg elevators @ 1.60 m/s)

Main Results

Interval (s)	32.8
Capacity Factor (%)	28.3

Additional Results

Car Capacity (persons)	13
No of Stops (including Home Floor)	8.5
Lowest Reversal Floor (where 1 = lowest floor)	1.0
Highest Reversal Floor (where 1 = lowest floor)	8.7
Average Passenger Transfer Time (s)	1.2
Distance Between Reversal Floors, Excluding Express (m)	28.5
Express Zone Distance (m)	0.0
Time Consumed When Stopping (s)	8.0
Round Trip Time (s)	131.3

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	ETA Traffic mode: Normal
Early car announcement	No
Load bypass (%)	Yes
Load bypass threshold (%)	65.0
Coincident call bonus (s)	10.0
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
Random number seed for passenger generator	1

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Ground	5.00
Level 1	3.50
Level 2	3.50
Level 3	3.50
Level 4	3.50
Level 5	3.50
Level 6	3.50
Level 7	3.50
Level 8	

ELEVATOR DATA

No of Elevators	4
Capacity (kg)	1000
Door Pre-opening Time (s)	0.00
Door Open Time (s)	1.80
Door Close Time (s)	2.90
Speed (m/s)	1.60
Acceleration (m/s ²)	0.70
Jerk (m/s ³)	1.40
Start Delay (s)	0.50
Home Floor	Ground

PASSENGER DATA

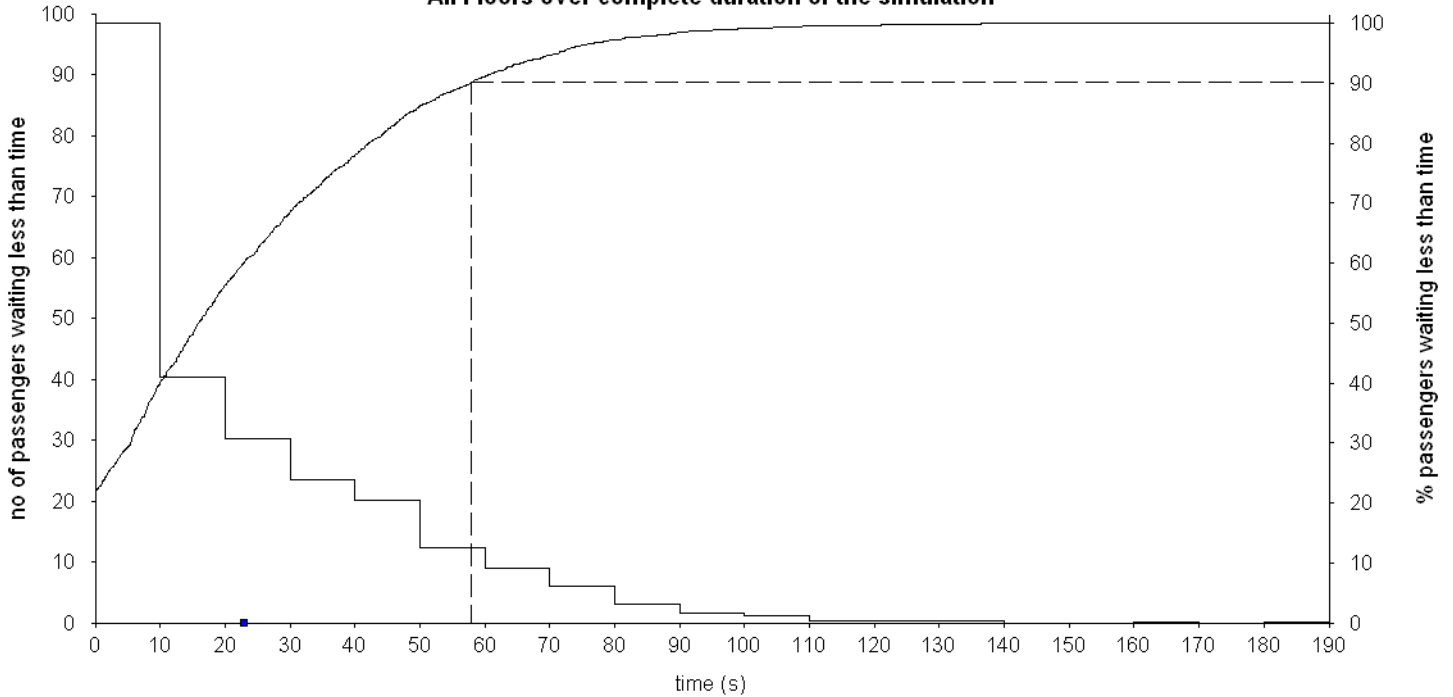
Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Capacity Factor (%)	80.00
Stair Factor (%)	50.00
Start Time (hrs:mins)	09:00
End Time (hrs:mins)	09:15
Arrival Rate as	15.0 % building pop/5min with split 40.0 % up, 40.0 % down, 20.0 % interfloor

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>
Ground	0		
Level 1	80		
Level 2	80		
Level 3	80		
Level 4	80		
Level 5	80		
Level 6	80		
Level 7	80		
Level 8	80		

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Passenger Waiting Times

All Floors over complete duration of the simulation

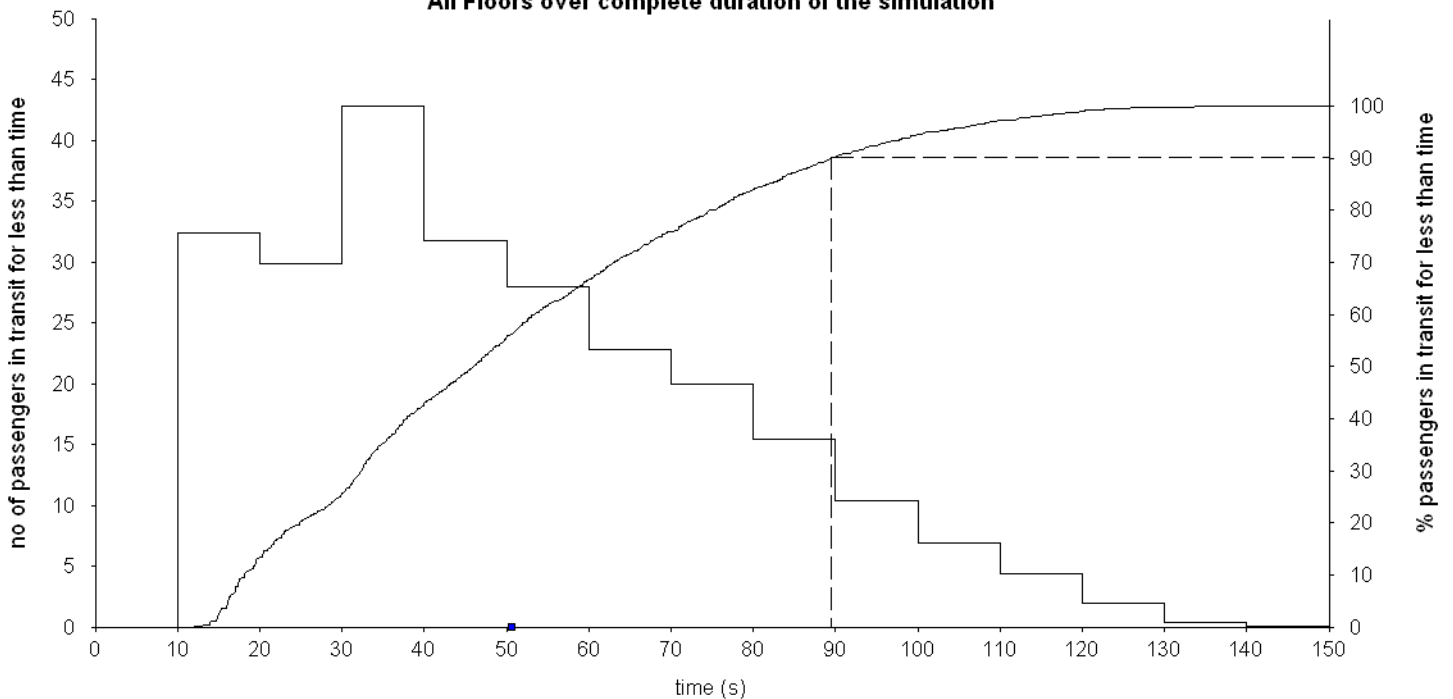


Average Waiting Time (s) 23.1 (+8.5/-4.3)
Longest Waiting Time (s) 116.5 (+67.5/-29.9)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Passenger Transit Times

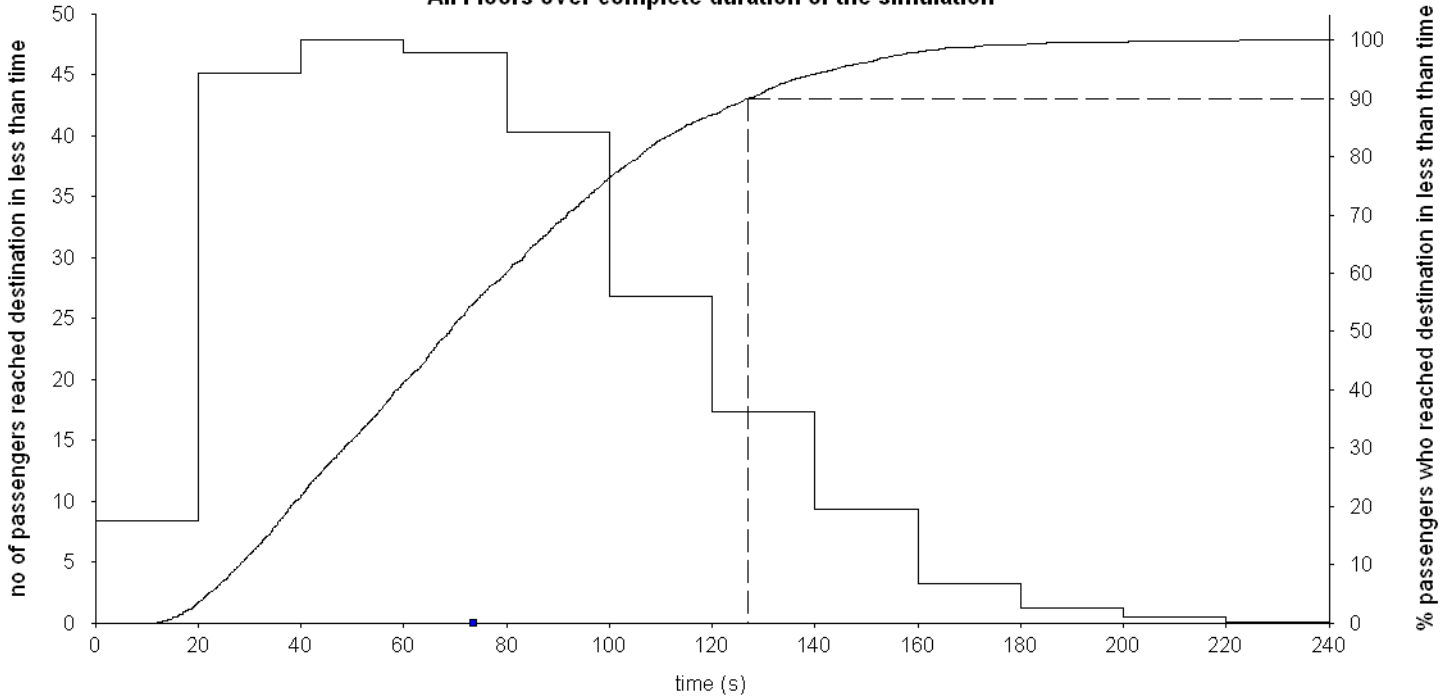
All Floors over complete duration of the simulation



Average Transit Time (s) 50.6 (+4.6/-3.1)
Longest Transit Time (s) 129.9 (+11.2/-9.9)

4 No. 1000 kg elevators @ 1.60 m/s
Average of all runs

Distribution of Time to Destination All Floors over complete duration of the simulation



Average Time To Destination (s) 73.7 (+13.1/-4.4)
Longest Time to Destination (s) 185.8 (+36.7/-25.2)

Shopping Centre with Car Park

Discussion

This example demonstrates the use of **Elevate's** simulation to analyse a shopping centre. To load the Elevate document select **File, Open** and then **Example 3.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.)

Elevator Data Advanced mode has been used to specify larger door dwell times than the defaults used in **Standard** mode.

The shopping centre elevators are used by different types of passenger. Using the **Advanced** mode of **Passenger Data**, **Elevate** has been used to define:

- standard adult passengers (**Period 1**)
- adult passengers with child in pram/buggy (**Period 2**)

The later type of passenger takes more elevator capacity (represented by a 150 kg passenger mass), and will take longer to load than a standard passenger.

In this instance both **Period 1** and **Period 2** start and finish at the same time as the different types of passengers are using the elevator at the same time. Please see **Example 5** for use of periods which start and stop at different times.

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Group Collective Traffic mode: Normal
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
Random number seed for passenger generator	1

BUILDING DATA

Floor Name	Floor Height (m)
Mall 1	3.80
Mall 2	3.80
Mall 3	3.80
Park 1	3.80
Park 2	

ELEVATOR DATA

	Car 1	Car 2	Car 3	Car 4
Capacity (kg)	1600	1600	1600	1600
Speed (m/s)	1.00	1.00	1.00	1.00
Acceleration (m/s ²)	0.40	0.40	0.40	0.40
Jerk (m/s ³)	0.80	0.80	0.80	0.80
Home Floor	Mall 1	Mall 1	Mall 1	Mall 1
Start Delay (s)	0.50	0.50	0.50	0.50
Door Pre-opening Time (s)	0.00	0.00	0.00	0.00
Door Open Time (s)	1.80	1.80	1.80	1.80
Door Close Time (s)	2.90	2.90	2.90	2.90
Door Dwell 1 (s)	6.00	6.00	6.00	6.00
Door Dwell 2 (s)	3.00	3.00	3.00	3.00

Floors served	Car 1	Car 2	Car 3	Car 4
Mall 1	Yes	Yes	Yes	Yes
Mall 2	Yes	Yes	Yes	Yes
Mall 3	Yes	Yes	Yes	Yes
Park 1	Yes	Yes	Yes	Yes
Park 2	Yes	Yes	Yes	Yes

Period 1

Start Time	0:00
End Time	0:15
Loading Time (s)	1.50
Unloading Time (s)	1.50
Passenger Mass (kg)	75
Capacity Factor (%)	60.00
Stair Factor (%)	30.00
Notes	Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)
		Mall 1	Mall 2	Mall 3	Park 1	Park 2
Mall 1	20.00	0.00	25.00	25.00	25.00	25.00
Mall 2	20.00	25.00	0.00	25.00	25.00	25.00
Mall 3	20.00	25.00	25.00	0.00	25.00	25.00
Park 1	15.00	33.30	33.30	33.30	0.00	0.00
Park 2	15.00	33.30	33.30	33.30	0.00	0.00

Period 2

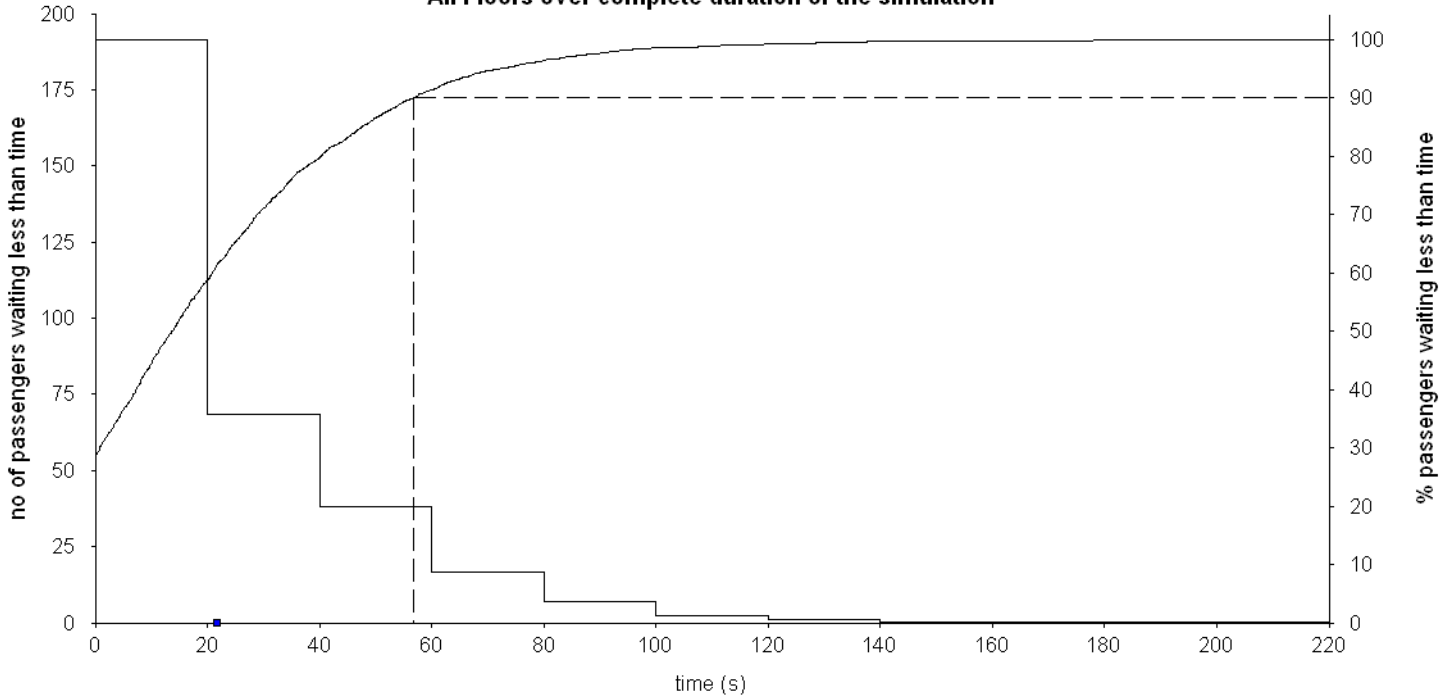
Start Time 0:00
 End Time 0:15
 Loading Time (s) 2.50
 Unloading Time (s) 2.50
 Passenger Mass (kg) 150
 Capacity Factor (%) 50.00
 Stair Factor (%) 0.00
 Notes Adult with child in pram/buggy

Floor Name	Arrival	Dest.	Dest.	Dest.	Dest.	Dest.
	Rate	Prob	Prob	Prob	Prob	Prob
	(Persons	Mall 1	Mall 2	Mall 3	Park 1	Park 2
	/5 mins)	(%)	(%)	(%)	(%)	(%)
Mall 1	7.00	0.00	25.00	25.00	25.00	25.00
Mall 2	7.00	25.00	0.00	25.00	25.00	25.00
Mall 3	7.00	25.00	25.00	0.00	25.00	25.00
Park 1	5.00	33.30	33.30	33.30	0.00	0.00
Park 2	5.00	33.30	33.30	33.30	0.00	0.00

Average of all runs

Distribution of Passenger Waiting Times

All Floors over complete duration of the simulation

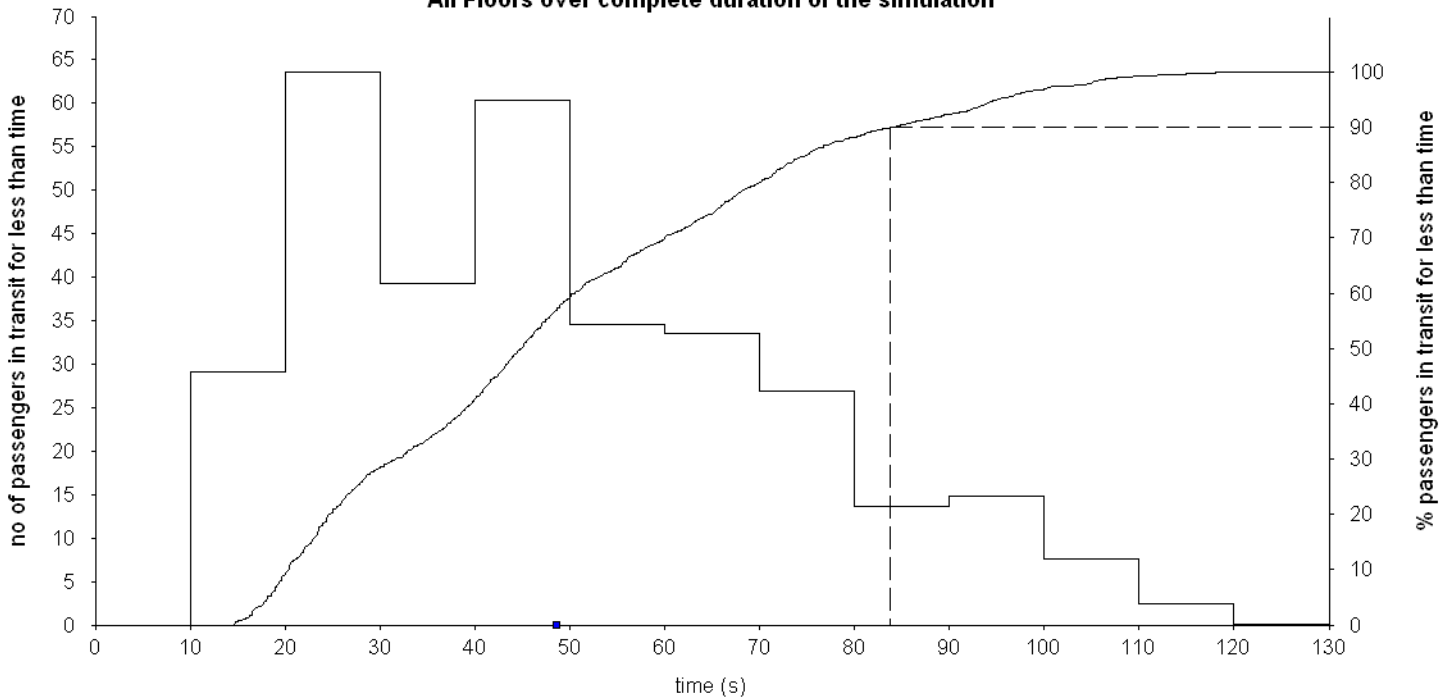


Average Waiting Time (s) 21.8 (+5.1/-2.4)
 Longest Waiting Time (s) 144.6 (+72.6/-46.6)

Average of all runs

Distribution of Passenger Transit Times

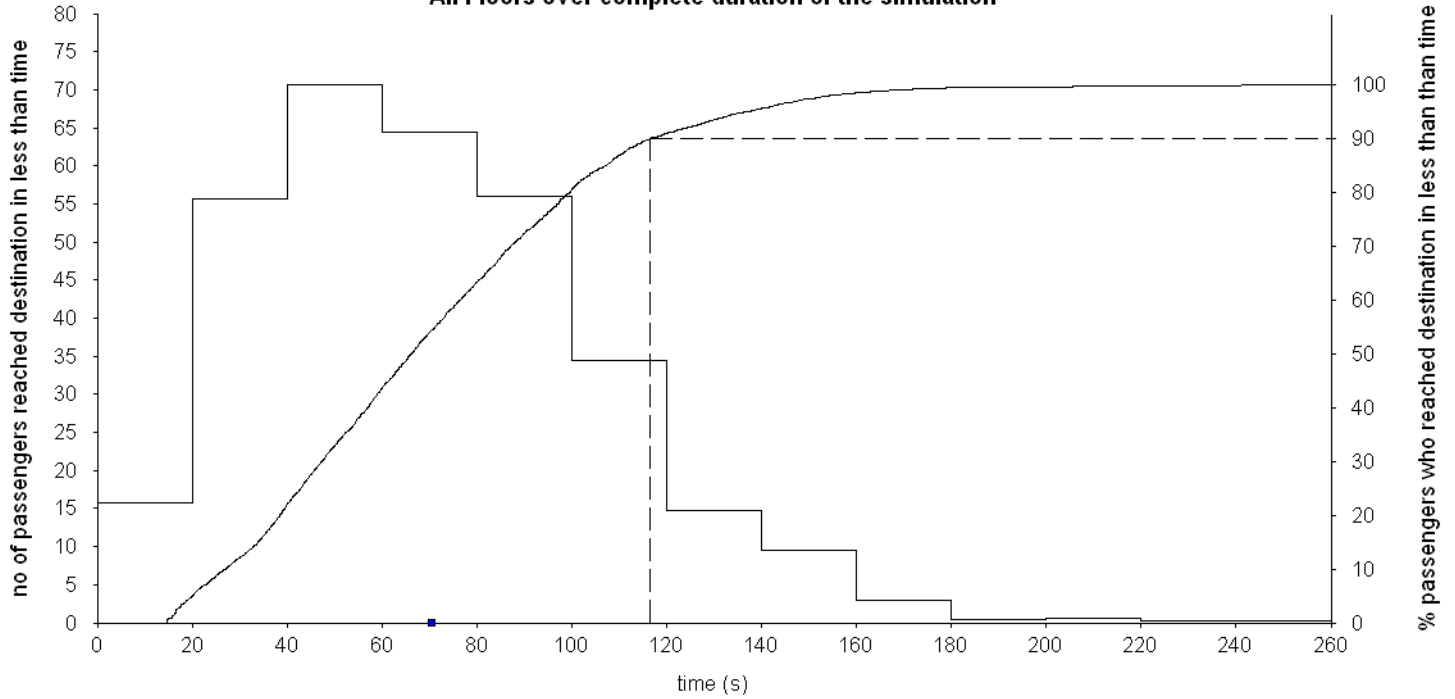
All Floors over complete duration of the simulation



Average Transit Time (s) 48.7 (+1.7/-1.6)
 Longest Transit Time (s) 116.4 (+5.6/-6.9)

Average of all runs

Distribution of Time to Destination All Floors over complete duration of the simulation



Average Time To Destination (s) 70.5 (+6.4/-4.0)
Longest Time to Destination (s) 201.3 (+43.4/-41.5)

High Rise Zoning

Discussion

This example demonstrates the use of **Elevate** to analyse an office building with zoned elevators. To load the Elevate document select **File, Open** and then **Example 4a.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.) Repeat to open **Example 4b.elv**.

Each elevator bank should be analysed separately. Analysis of the low rise bank would be similar to **Example 1**. To analyse the high rise elevator bank, the floors served have been entered in **Building Data**.

In this example, a range of configurations are selected for analysis in **Elevator Data**.

Example 4a provides an analysis of the traffic using the **General analysis**. The **General analysis** is a round trip time calculation, so calculates results including the **Interval**.

Example 4b provides an analysis using **Simulation**. Calculated results include **Average Passenger Waiting Time** and **Average Passenger Transit Time**.

ANALYSIS DATA

Analysis Type	General analysis
Measurement system	Metric
Losses (%)	10.00

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Car Park	3.60
Level 1	5.00
Level 2	3.80
Level 3	3.80
Level 4	3.80
Level 5	3.80
Level 6	3.80
Level 7	3.80
Level 8	3.80
Level 9	3.80
Level 10	3.80
Level 11	3.80
Level 12	3.80
Level 13	3.80
Level 14	3.80
Level 15	3.80
Level 16	

<i>Express Zone</i>	
Lowest floor not served by elevators	Level 2
Highest floor not served by elevators	Level 8

ELEVATOR DATA

No of Elevators	SELECT	Min: 3	Max: 5
Capacity (kg)	SELECT	Min: 1000	Max: 1600
Door Pre-opening Time (s)	AUTO		
Door Open Time (s)	AUTO		
Door Close Time (s)	AUTO		
Speed (m/s)	SELECT	Min: 2.50	Max: 3.15
Acceleration (m/s ²)	AUTO		
Jerk (m/s ³)	AUTO		
Start Delay (s)	0.50		
Home Floor	Level 1		

PASSENGER DATA

Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Stair Factor (%)	0.00
Arrival Rate as	% building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Car Park	0			1.00
Level 1	0			14.00
Level 9	50			0.00
Level 10	50			0.00
Level 11	50			0.00
Level 12	50			0.00
Level 13	50			0.00
Level 14	50			0.00
Level 15	50			0.00
Level 16	50			0.00

GENERAL ANALYSIS RESULTS (SUMMARY)

<i>No. of Elevators</i>	<i>Speed (m/s)</i>	<i>Acceln (m/s²)</i>	<i>Jerk (m/s³)</i>	<i>Elevator Capacity (kg)</i>	<i>Door Type</i>	<i>Door Times Pre-Open, Open, Close (s)</i>	<i>Prob No of Stops</i>	<i>Lowest Reversal Floor</i>	<i>Highest Reversal Floor</i>	<i>Interval (s)</i>	<i>Capacity Factor (%)</i>
3	2.50	0.80	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	7.1	1.5	9.6	48.3	74.3
3	2.50	0.80	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	7.1	1.5	9.6	48.3	60.3
3	2.50	0.80	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	7.1	1.5	9.6	48.3	46.0
3	3.15	1.00	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	6.7	1.6	9.5	42.4	65.2
3	3.15	1.00	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	6.7	1.6	9.5	42.4	53.0
3	3.15	1.00	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	6.7	1.6	9.5	42.4	40.4
4	2.50	0.80	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	5.5	1.7	9.1	29.5	45.3
4	2.50	0.80	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	5.5	1.7	9.1	29.5	36.8
4	2.50	0.80	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	5.5	1.7	9.1	29.5	28.0
4	3.15	1.00	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	5.0	1.8	8.9	25.2	38.7
4	3.15	1.00	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	5.0	1.8	8.9	25.2	31.4
4	3.15	1.00	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	5.0	1.8	8.9	25.2	24.0
5	2.50	0.80	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	4.3	1.9	8.4	19.7	30.3
5	2.50	0.80	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	4.3	1.9	8.4	19.7	24.6
5	2.50	0.80	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	4.3	1.9	8.4	19.7	18.8
5	3.15	1.00	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	3.8	2.0	8.1	16.4	25.2
5	3.15	1.00	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	3.8	2.0	8.1	16.4	20.5
5	3.15	1.00	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	3.8	2.0	8.1	16.4	15.6

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Group Collective Traffic mode: Up peak 1
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
Random number seed for passenger generator	1

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Car Park	3.60
Level 1	5.00
Level 2	3.80
Level 3	3.80
Level 4	3.80
Level 5	3.80
Level 6	3.80
Level 7	3.80
Level 8	3.80
Level 9	3.80
Level 10	3.80
Level 11	3.80
Level 12	3.80
Level 13	3.80
Level 14	3.80
Level 15	3.80
Level 16	

ELEVATOR DATA

No of Elevators	SELECT	Min: 3	Max: 5
Capacity (kg)	SELECT	Min: 1000	Max: 1600
Door Pre-opening Time (s)	AUTO		
Door Open Time (s)	AUTO		
Door Close Time (s)	AUTO		
Speed (m/s)	SELECT	Min: 2.50	Max: 3.15
Acceleration (m/s ²)	AUTO		
Jerk (m/s ³)	AUTO		
Start Delay (s)	0.50		
Home Floor	Level 1		

PASSENGER DATA

Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Capacity Factor (%)	80.00
Stair Factor (%)	0.00
Start Time (hrs:mins)	09:00
End Time (hrs:mins)	09:15
Arrival Rate as	% building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Car Park	0			1.00
Level 1	0			14.00
Level 2	0			0.00
Level 3	0			0.00
Level 4	0			0.00
Level 5	0			0.00
Level 6	0			0.00
Level 7	0			0.00
Level 8	0			0.00
Level 9	50			0.00
Level 10	50			0.00
Level 11	50			0.00
Level 12	50			0.00
Level 13	50			0.00
Level 14	50			0.00
Level 15	50			0.00
Level 16	50			0.00

SIMULATION RESULTS

Based on average of all runs over complete duration of the simulation

No. of Elevators	Speed (m/s)	Acceln (m/s ²)	Jerk (m/s ³)	Elevator Capacity (kg)	Door Type	Door Times Pre-Open, Open, Close (s)	Average Waiting Time (s)	Longest Waiting Time (s)	Average Transit Time (s)	Longest Transit Time (s)	Average Time to Dest (s)	Longest Time to Dest (s)
3	2.50	0.80	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	46.8	124.1	71.1	131.5	118.0	226.2
3	2.50	0.80	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	26.0	93.1	76.5	147.7	102.5	213.4
3	2.50	0.80	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	19.9	84.6	80.8	157.6	100.7	215.5
3	3.15	1.00	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	35.2	105.5	66.6	125.5	101.9	208.2
3	3.15	1.00	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	20.4	79.9	71.6	138.6	92.0	192.6
3	3.15	1.00	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	14.9	77.7	74.8	152.1	89.7	200.7
4	2.50	0.80	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	13.5	64.0	65.6	130.2	79.0	167.0
4	2.50	0.80	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	9.1	55.5	69.2	144.1	78.3	179.5
4	2.50	0.80	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	8.1	57.7	71.2	155.7	79.3	193.5
4	3.15	1.00	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	8.4	49.6	59.8	126.4	68.2	152.5
4	3.15	1.00	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	7.0	50.5	62.7	134.2	69.6	167.7
4	3.15	1.00	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	6.1	49.6	63.9	147.5	70.1	176.5
5	2.50	0.80	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	5.0	47.9	60.9	127.6	65.8	147.9
5	2.50	0.80	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	4.8	48.5	62.9	141.4	67.7	155.7
5	2.50	0.80	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	4.6	51.6	64.3	149.0	68.9	163.1
5	3.15	1.00	1.60	1000	CO 1100mm	0.00, 1.80, 2.90	3.1	39.0	55.5	124.8	58.6	134.8
5	3.15	1.00	1.60	1250	CO 1100mm	0.00, 1.80, 2.90	3.3	39.0	57.7	141.8	61.0	146.8
5	3.15	1.00	1.60	1600	CO 1100mm	0.00, 1.80, 2.90	2.8	35.3	57.7	148.2	60.5	150.4

Changing Interfloor Traffic

Discussion

This example demonstrates the use of **Elevate's** simulation to analyse the changing levels of traffic. To load the Elevate document select **File, Open** and then **Example 5.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.)

The **Advanced** mode of **Passenger Data** is used. **Period 1** to **Period 5** have similar data, except the **Arrival Rates**, which increase, then decrease. **Period 6** defines additional traffic (e.g. post trolleys) which are constant in use throughout the whole time period.

The Results give the normal summary of **Passenger Waiting and Transit Times**. A more detailed analysis can be carried out by viewing the Excel output which contains details of the Waiting, Transit, etc. times of each individual passenger.

ANALYSIS DATA

Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Group Collective Traffic mode: Normal
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	1
Random number seed for passenger generator	1

BUILDING DATA

Floor Name	Floor Height (m)
Level 1	3.80
Level 2	3.80
Level 3	3.80
Level 4	3.80
Level 5	3.80
Level 6	3.80
Level 7	3.80
Level 8	

ELEVATOR DATA

	Car 1	Car 2	Car 3	Car 4	Car 5	Car 6
Capacity (kg)	1000	1000	1000	1000	1000	1000
Speed (m/s)	1.60	1.60	1.60	1.60	1.60	1.60
Acceleration (m/s ²)	0.70	0.70	0.70	0.70	0.70	0.70
Jerk (m/s ³)	1.40	1.40	1.40	1.40	1.40	1.40
Home Floor	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1
Start Delay (s)	0.50	0.50	0.50	0.50	0.50	0.50
Door Pre-opening Time (s)	0.00	0.00	0.00	0.00	0.00	0.00
Door Open Time (s)	1.80	1.80	1.80	1.80	1.80	1.80
Door Close Time (s)	2.90	2.90	2.90	2.90	2.90	2.90
Door Dwell 1 (s)	3.00	3.00	3.00	3.00	3.00	3.00
Door Dwell 2 (s)	2.00	2.00	2.00	2.00	2.00	2.00

Floors served	Car 1	Car 2	Car 3	Car 4	Car 5	Car 6
Level 1	Yes	Yes	Yes	Yes	Yes	Yes
Level 2	Yes	Yes	Yes	Yes	Yes	Yes
Level 3	Yes	Yes	Yes	Yes	Yes	Yes
Level 4	Yes	Yes	Yes	Yes	Yes	Yes
Level 5	Yes	Yes	Yes	Yes	Yes	Yes
Level 6	Yes	Yes	Yes	Yes	Yes	Yes
Level 7	Yes	Yes	Yes	Yes	Yes	Yes
Level 8	Yes	Yes	Yes	Yes	Yes	Yes

Period 1

Start Time	0:00
End Time	0:05
Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Capacity Factor (%)	80.00
Stair Factor (%)	30.00
Notes	Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Level 1 (%)	Dest. Level 2 (%)	Dest. Level 3 (%)	Dest. Level 4 (%)	Dest. Level 5 (%)	Dest. Level 6 (%)	Dest. Level 7 (%)	Dest. Level 8 (%)
Level 1	1.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	1.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	1.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	1.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	1.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	1.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	1.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	1.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Period 1

Start Time 0:00
 End Time 0:05
 Loading Time (s) 1.20
 Unloading Time (s) 1.20
 Passenger Mass (kg) 75
 Capacity Factor (%) 80.00
 Stair Factor (%) 30.00
 Notes Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob Level 1 (%)	Dest. Prob Level 2 (%)	Dest. Prob Level 3 (%)	Dest. Prob Level 4 (%)	Dest. Prob Level 5 (%)	Dest. Prob Level 6 (%)	Dest. Prob Level 7 (%)	Dest. Prob Level 8 (%)
Level 1	1.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	1.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	1.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	1.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	1.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	1.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	1.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	1.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Period 2

Start Time 0:05
 End Time 0:10
 Loading Time (s) 1.20
 Unloading Time (s) 1.20
 Passenger Mass (kg) 75
 Capacity Factor (%) 80.00
 Stair Factor (%) 30.00
 Notes Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob Level 1 (%)	Dest. Prob Level 2 (%)	Dest. Prob Level 3 (%)	Dest. Prob Level 4 (%)	Dest. Prob Level 5 (%)	Dest. Prob Level 6 (%)	Dest. Prob Level 7 (%)	Dest. Prob Level 8 (%)
Level 1	10.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	10.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	10.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	10.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	10.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	10.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	10.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	10.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Period 3

Start Time 0:10
 End Time 0:15
 Loading Time (s) 1.20
 Unloading Time (s) 1.20
 Passenger Mass (kg) 75
 Capacity Factor (%) 80.00
 Stair Factor (%) 30.00
 Notes Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob Level 1 (%)	Dest. Prob Level 2 (%)	Dest. Prob Level 3 (%)	Dest. Prob Level 4 (%)	Dest. Prob Level 5 (%)	Dest. Prob Level 6 (%)	Dest. Prob Level 7 (%)	Dest. Prob Level 8 (%)
Level 1	30.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	30.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	30.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	30.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	30.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	30.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	30.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	30.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Period 4

Start Time 0:15
 End Time 0:20
 Loading Time (s) 1.20
 Unloading Time (s) 1.20
 Passenger Mass (kg) 75
 Capacity Factor (%) 80.00
 Stair Factor (%) 30.00
 Notes Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob Level 1 (%)	Dest. Prob Level 2 (%)	Dest. Prob Level 3 (%)	Dest. Prob Level 4 (%)	Dest. Prob Level 5 (%)	Dest. Prob Level 6 (%)	Dest. Prob Level 7 (%)	Dest. Prob Level 8 (%)
Level 1	10.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	10.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	10.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	10.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	10.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	10.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	10.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	10.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Period 5

Start Time 0:20
 End Time 0:25
 Loading Time (s) 1.20
 Unloading Time (s) 1.20
 Passenger Mass (kg) 75
 Capacity Factor (%) 80.00
 Stair Factor (%) 30.00
 Notes Passengers

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob Level 1 (%)	Dest. Prob Level 2 (%)	Dest. Prob Level 3 (%)	Dest. Prob Level 4 (%)	Dest. Prob Level 5 (%)	Dest. Prob Level 6 (%)	Dest. Prob Level 7 (%)	Dest. Prob Level 8 (%)
Level 1	1.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	1.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	1.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	1.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	1.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	1.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	1.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	1.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Period 6

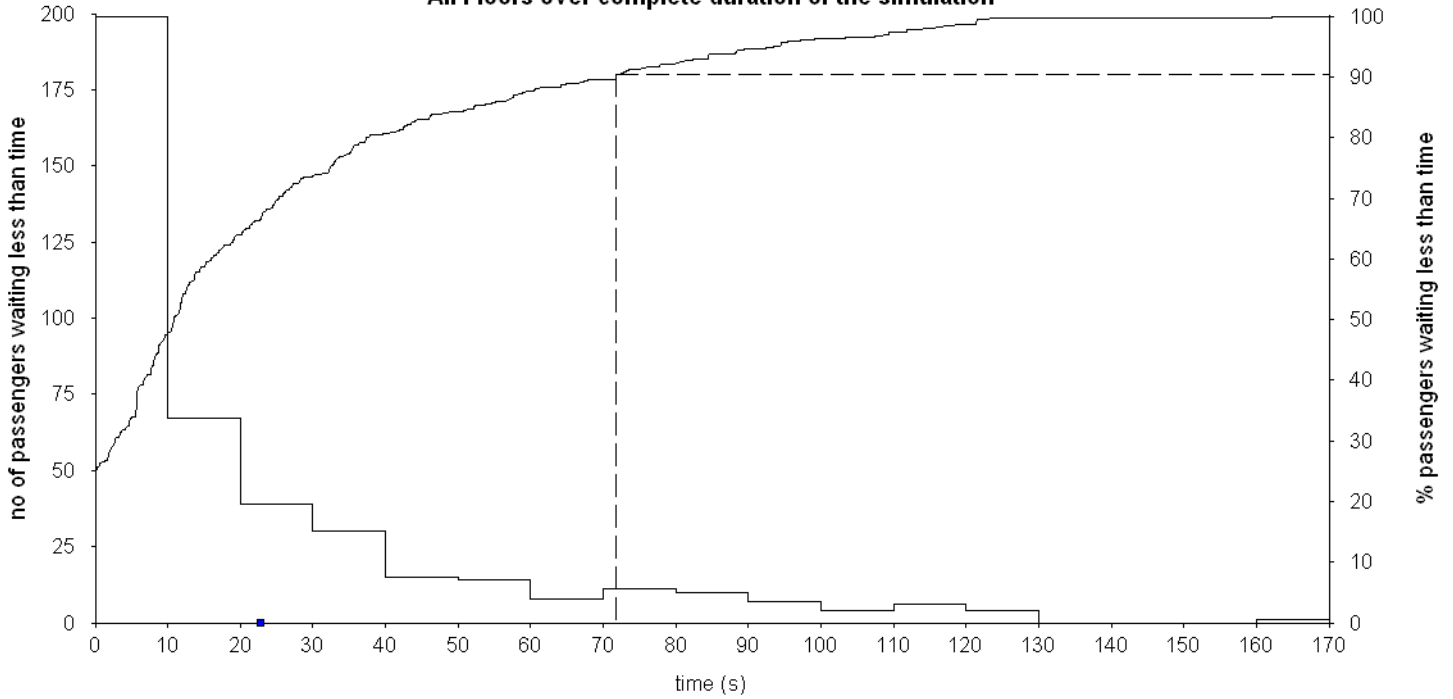
Start Time 0:00
 End Time 0:25
 Loading Time (s) 3.00
 Unloading Time (s) 3.00
 Passenger Mass (kg) 300
 Capacity Factor (%) 60.00
 Stair Factor (%) 0.00
 Notes Post Trolley

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob Level 1 (%)	Dest. Prob Level 2 (%)	Dest. Prob Level 3 (%)	Dest. Prob Level 4 (%)	Dest. Prob Level 5 (%)	Dest. Prob Level 6 (%)	Dest. Prob Level 7 (%)	Dest. Prob Level 8 (%)
Level 1	1.00	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 2	1.00	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30
Level 3	1.00	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30	14.30
Level 4	1.00	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30	14.30
Level 5	1.00	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30	14.30
Level 6	1.00	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30	14.30
Level 7	1.00	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30	14.30
Level 8	1.00	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.00	14.30

Average of all runs

Distribution of Passenger Waiting Times

All Floors over complete duration of the simulation

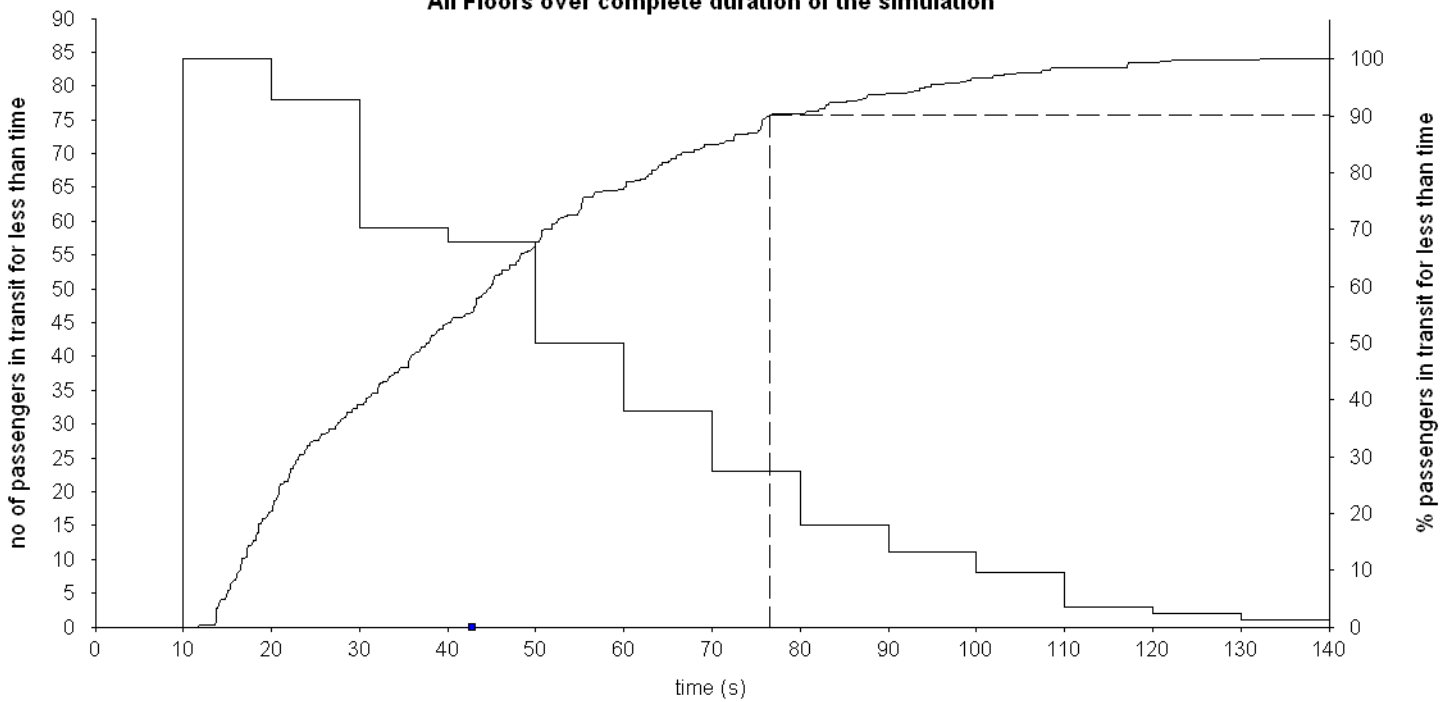


Average Waiting Time (s) 22.9 (+0.0/-0.0)
Longest Waiting Time (s) 162.1 (+0.0/-0.0)

Average of all runs

Distribution of Passenger Transit Times

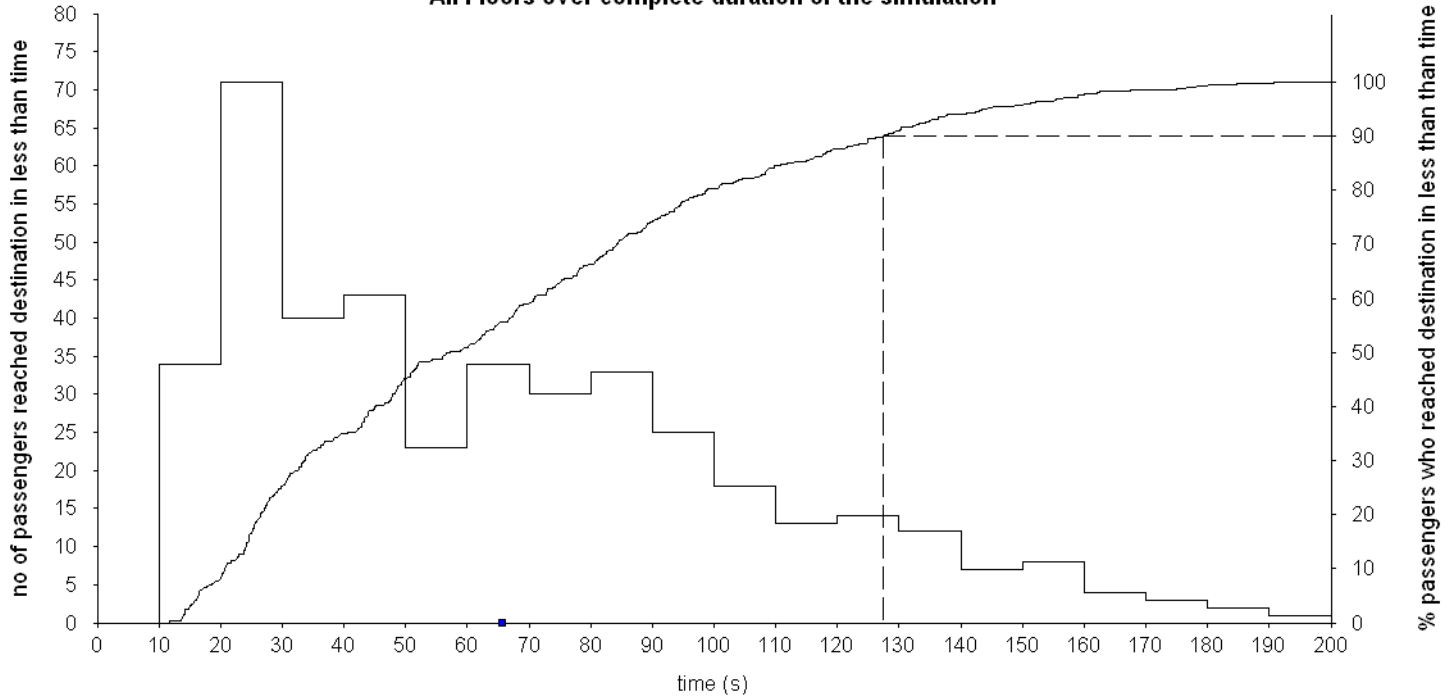
All Floors over complete duration of the simulation



Average Transit Time (s) 42.8 (+0.0/-0.0)
Longest Transit Time (s) 132.1 (+0.0/-0.0)

Average of all runs

Distribution of Time to Destination All Floors over complete duration of the simulation



Average Time To Destination (s) 65.7 (+0.0/-0.0)
Longest Time to Destination (s) 190.7 (+0.0/-0.0)

Double Deck Up Peak

Discussion

This example demonstrates the use of **General Analysis Double Deck** to assess the performance of a double deck solution for a 22 storey building with 133 persons per floor and 8 No 1800 kg per deck elevators. In this instance, the analysis is for just up peak traffic.

The total handling capacity is 16% of the building population in five minutes. Note in Passenger Data that 8% arrive at Level 1 and 8% arrive at Level 2.

To load the Elevate document select **File, Open** and then **Example 6.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.)

ANALYSIS DATA

Analysis Type Double Deck General analysis
 Measurement system Metric
 Losses (%) 5.00

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Level 1	3.60
Level 2	3.60
Level 3	3.60
Level 4	3.60
Level 5	3.60
Level 6	3.60
Level 7	3.60
Level 8	3.60
Level 9	3.60
Level 10	3.60
Level 11	3.60
Level 12	3.60
Level 13	3.60
Level 14	3.60
Level 15	3.60
Level 16	3.60
Level 17	3.60
Level 18	3.60
Level 19	3.60
Level 20	3.60
Level 21	3.60
Level 22	3.60

ELEVATOR DATA

No of Elevators 8
 Capacity (kg) 1800
 Door Pre-opening Time (s) 0.00
 Door Open Time (s) 1.80
 Door Close Time (s) 2.90
 Speed (m/s) 2.50
 Acceleration (m/s²) 0.80
 Jerk (m/s³) 2.00
 Start Delay (s) 0.50
 Home Floor Level 1

PASSENGER DATA

Loading Time (s) 1.20
 Unloading Time (s) 1.20
 Passenger Mass (kg) 75
 Stair Factor (%) 0.00
 Arrival Rate as % building population in 5 mins

<i>Floor Name</i>	<i>No of people</i>	<i>Area (m²)</i>	<i>Area/person</i>	<i>Arrival Rate</i>
Level 1	0			8.00
Level 2	0			8.00
Level 3	133			0.00
Level 4	133			0.00
Level 5	133			0.00
Level 6	133			0.00
Level 7	133			0.00
Level 8	133			0.00
Level 9	133			0.00
Level 10	133			0.00
Level 11	133			0.00
Level 12	133			0.00
Level 13	133			0.00
Level 14	133			0.00
Level 15	133			0.00
Level 16	133			0.00
Level 17	133			0.00
Level 18	133			0.00
Level 19	133			0.00
Level 20	133			0.00
Level 21	133			0.00
Level 22	133			0.00

DOUBLE DECK GENERAL ANALYSIS RESULTS (8 No. 1800 kg elevators @ 2.50 m/s)

Main Results

Interval (s)	25.6
Capacity Factor (%)	75.5
Figure of Merit (%)	74.5

Additional Results

Car Capacity (persons)	24
No of Stops (including Home Floor)	10.7
Lowest Reversal Floor (where 1 = lowest floor)	1.0
Highest Reversal Floor (where 1 = lowest floor)	20.9
Average Passenger Transfer Time (s)	1.2
Distance Between Reversal Floors, Excluding Express (m)	71.8
Express Zone Distance (m)	0.0
Time Consumed When Stopping (s)	8.7
Round Trip Time (s)	204.4

Complex traffic for Double Deck

Discussion

This example demonstrates the use of **General Analysis Double Deck** to assess the performance of a double deck solution for a complex traffic scenario.

To load the Elevate document select **File, Open** and then **Example 7.elv**. (If the file is not there, change the **Look in** drop down to point to the folder in which **Elevate** has been installed.)

This example is intended to represent the lunch peak in an office building where there are double storey conference and restaurant facilities on the top two floors. The morning conference ends during the lunchtime peak. Conference delegates are visitors to the building. The peak traffic is a combination of:

- Resident passengers travelling from their offices to the restaurant for lunch
- Resident passengers travelling back to their offices after lunch
- Resident passengers travelling to the ground floor to leave the building to buy sandwiches or eat out
- Resident passengers returning from buying/eating lunch out.

The example traffic flow entered in **Passenger Data** has been calculated.

ANALYSIS DATA

Analysis Type	Double Deck General analysis
Measurement system	Metric
Losses (%)	5.00

BUILDING DATA

<i>Floor Name</i>	<i>Floor Height (m)</i>
Level 1	3.60
Level 2	3.60
Level 3	3.60
Level 4	3.60
Level 5	3.60
Level 6	3.60
Level 7	3.60
Level 8	3.60
Level 9	3.60
Level 10	3.60
Level 11	3.60
Level 12	3.60
Level 13	3.60
Level 14	

ELEVATOR DATA

No of Elevators	8
Capacity (kg)	1250
Door Pre-opening Time (s)	0.00
Door Open Time (s)	1.80
Door Close Time (s)	2.90
Speed (m/s)	2.50
Acceleration (m/s ²)	0.80
Jerk (m/s ³)	2.00
Start Delay (s)	0.50
Home Floor	Level 1

PASSENGER DATA

Floor Name	No of people
Level 1	0
Level 2	0
Level 3	0
Level 4	0
Level 5	0
Level 6	0
Level 7	0
Level 8	0
Level 9	0
Level 10	0
Level 11	0
Level 12	0
Level 13	0
Level 14	0

Loading Time (s)	1.20
Unloading Time (s)	1.20
Passenger Mass (kg)	75
Stair Factor (%)	0.00

Floor Name	Arrival Rate (Persons /5 mins)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)	Dest. Prob (%)
		Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12
Level 1	75.00	0.00	0.00	15.00	0.00	17.00	0.00	17.00	0.00	17.00	0.00	17.00	0.00
Level 2	75.00	0.00	0.00	0.00	15.00	0.00	17.00	0.00	17.00	0.00	17.00	0.00	17.00
Level 3	25.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 4	25.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 5	25.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 6	25.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 7	25.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 8	25.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 9	25.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 10	25.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 11	25.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 12	25.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level 13	120.00	50.00	0.00	10.00	0.00	10.00	0.00	10.00	0.00	10.00	0.00	10.00	0.00
Level 14	120.00	0.00	50.00	0.00	10.00	0.00	10.00	0.00	10.00	0.00	10.00	0.00	10.00

Floor Name	Dest. Prob (%)	Dest. Prob (%)
	Level 13	Level 14
Level 1	17.00	0.00
Level 2	0.00	17.00
Level 3	50.00	0.00
Level 4	0.00	50.00
Level 5	50.00	0.00
Level 6	0.00	50.00
Level 7	50.00	0.00
Level 8	0.00	50.00
Level 9	50.00	0.00
Level 10	0.00	50.00
Level 11	50.00	0.00
Level 12	0.00	50.00
Level 13	0.00	0.00
Level 14	0.00	0.00

DOUBLE DECK GENERAL ANALYSIS RESULTS (8 No. 1250 kg elevators @ 2.50 m/s)

Main Results

Interval (s)	26.7
Capacity Factor (%)	68.2
Figure of Merit (%)	83.4

Additional Results

Car Capacity (persons)	16
No of Stops (including Home Floor)	11.9
Lowest Reversal Floor (where 1 = lowest floor)	1.0
Highest Reversal Floor (where 1 = lowest floor)	13.0
Average Passenger Transfer Time (s)	1.2
Distance Between Reversal Floors, Excluding Express (m)	43.2
Express Zone Distance (m)	0.0
Time Consumed When Stopping (s)	8.5
Round Trip Time (s)	214.0