



Optimizing Manpower Allocation to Improve the Response Time of Portering Department



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Problems & Objectives

Problems

- 82% of requestors unsatisfied with the portering department's services
- Overall response time of porters does not meet KPI

Objectives

- Optimize Central Portering Manpower Allocation
- Evaluate Staffing Adequacy of Station Portering
- Recommend Manpower Numbers Required to Meet KPI

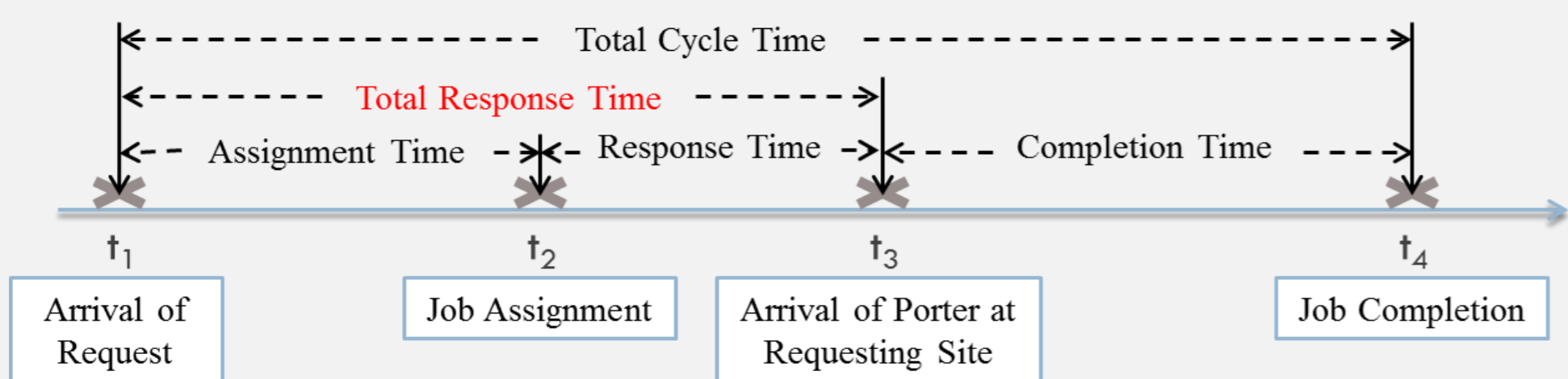
Percentile	Current 95th	KPI 95th
Total Response Time (mins)	82.25	≤ 20

Methodology

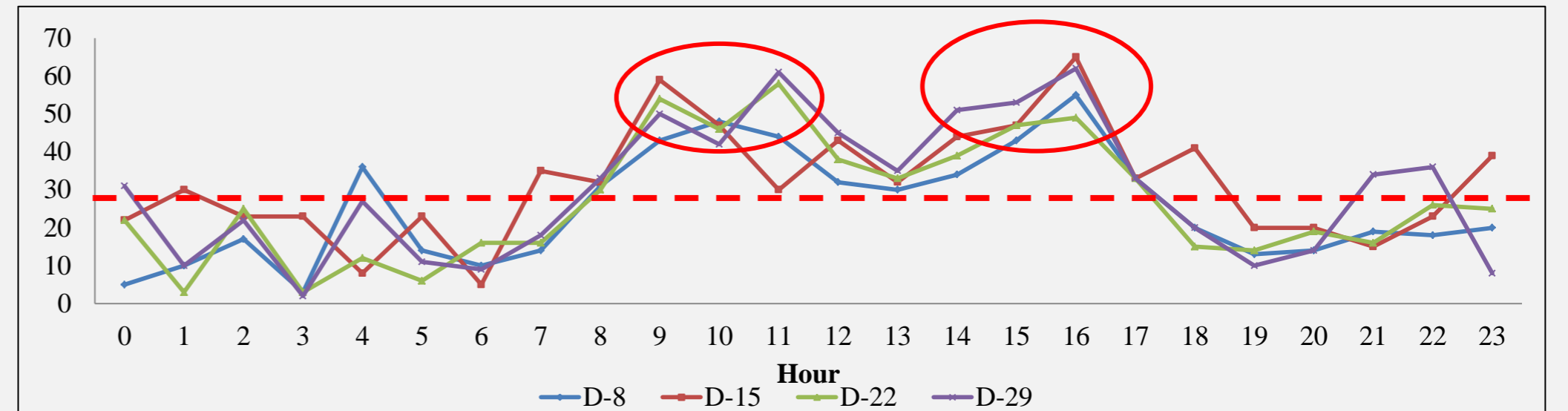
- Observation & Data Collection
 - Job shadowing
 - Process mapping
- System Analysis & Model Building
 - Input data analysis
 - Queuing model using SIMUL8
- Testing & Validation
 - Output analysis
 - Refine simulation model
- Recommendation
 - Process improvement
 - Scenario Analysis

Current System Analysis

Request Completion Flow



Central Portering Hourly Demand

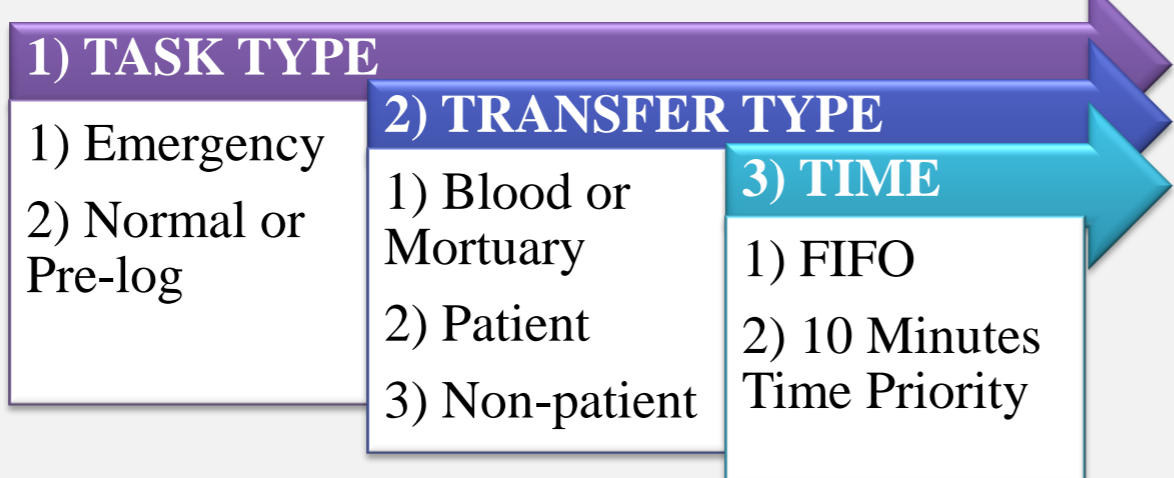


- Peak period between 0900 – 1600hrs. Similar pattern for both weekdays and weekends
- Overall demand is lower during the weekends compared to weekdays

Types of Jobs

Patient Single Trip	Non-patient Single Trip
Patient Round Trip	Non-patient Round Trip

Urgency Level of Central Portering Jobs

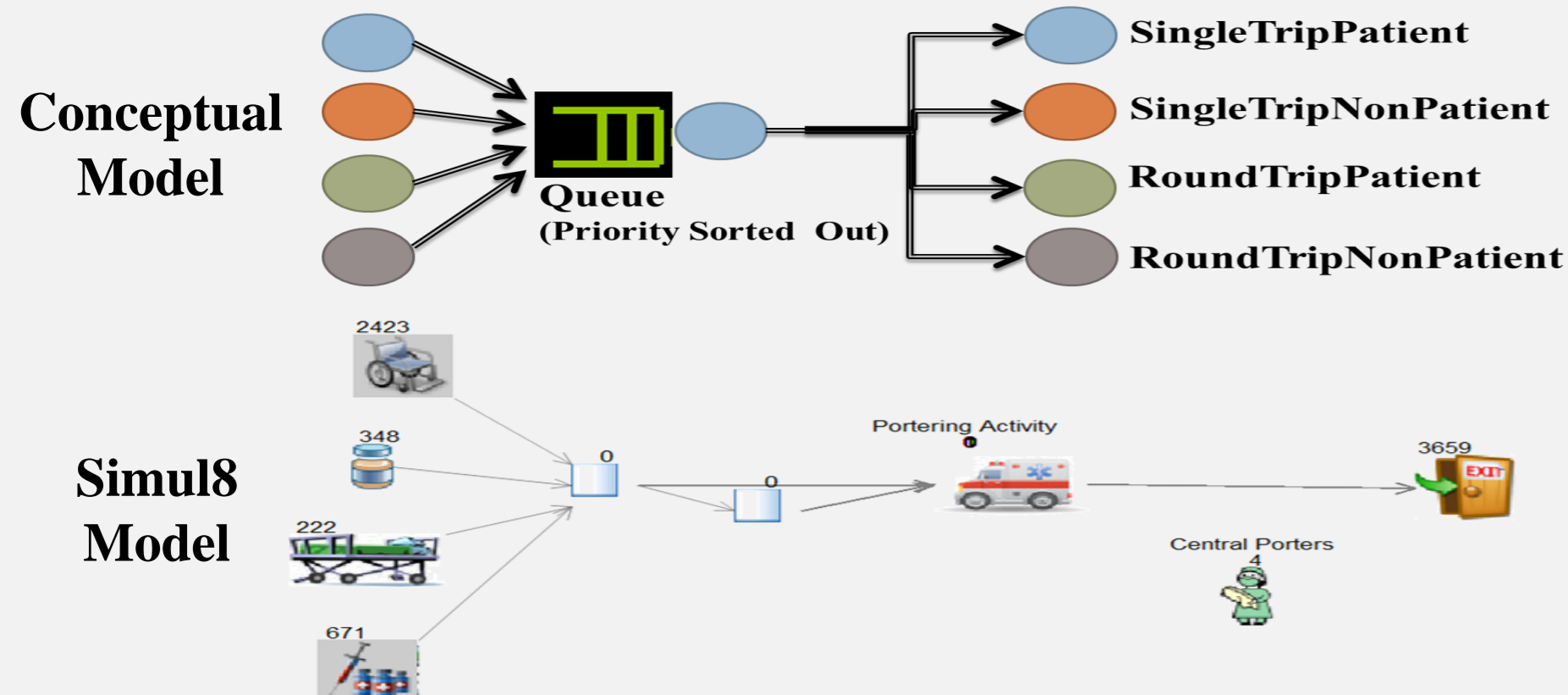


Porters

- Central Porters
 - 83 Porters assigned to staggered shifts
 - Full-time (Day: 8 hours; Night: 10 hours) and part-time (Day: usually 4 hours) porters
- Station Porters
 - 63 porters allocated across more than 20 stations
 - Working hours and number of shifts dependent on the nature of work and level of demand at the department being served by the station
 - Number of porters assigned to a station dependent on request send in by department

Approach

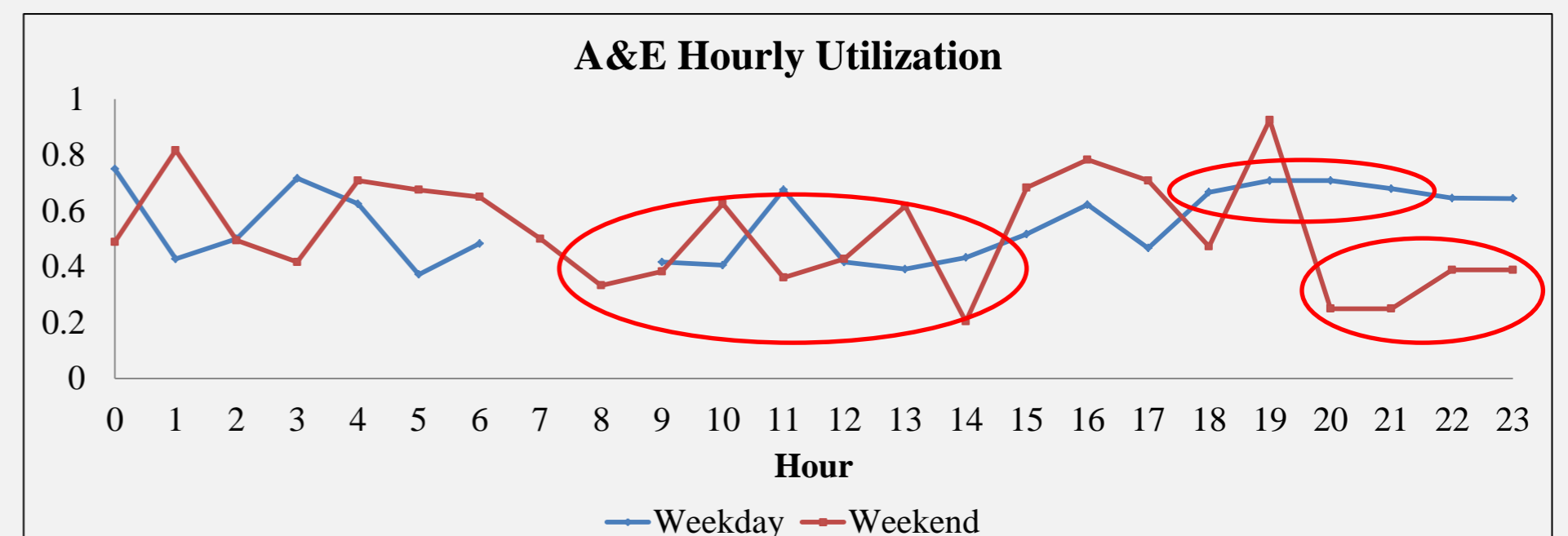
Central Portering Simulation Model (Queuing Theory)



- Arrival: Arrival rates by job types, day of week, peak/non-peak periods
- Queue Discipline: 6 levels of urgency with 10 minutes time priority
- Portering Activity: Service rates by job types
- Resource (Porters): Staggered shifts; Breaks; Travel time; Batching behavior

Station Portering Utilization Analysis

- Due to data limitations, unable to build simulation model
- Conducted utilization analysis to evaluate staffing adequacy



- Generally lower utilization between 0800 to 1400hrs
- Weekday: Higher utilization over sustained period from 1800 to 2100hrs
- Weekend: Lower utilization over sustained period from 2000 to 2300hrs

Recommendations

Improved Central Portering Manpower Allocation

	MON	TUES	WED	THU	FRI	SAT	SUN
FT7	1	2	3	3	2	1	1
FT8	4 (-2)	8 (-2)	8 (-2)	8 (-2)	7 (-2)	3	4
FT9	3 (+2)	3 (+2)	3 (+2)	3 (+2)	3 (+2)	1	1
FT10	2 (+2)	4 (+2)	4 (+2)	4 (+2)	4 (+2)	3	2
FT11	1 (-1)	1 (-1)	0 (-1)	1 (-1)	1 (-1)	0	0
FT13	6	7	7	7	7	0	0
FT14	2	2	2	2	2	2	0
FT21	9 (-1)	10 (-1)	9 (-1)	13 (-1)	7 (-1)	9	6

Further Central Portering Manpower Allocation

	MON	TUES	WED	THU	FRI	SAT	SUN
FT7	4 (+3)	6 (+4)	7 (+4)	7 (+4)	6 (+4)	4 (+3)	3 (+2)
FT8	7 (+1)	12 (+2)	12 (+2)	12 (+2)	10 (+1)	5 (+2)	6 (+2)
FT9	5 (+4)	5 (+4)	5 (+4)	5 (+4)	5 (+4)	2 (+1)	2 (+1)
FT10	8 (+8)	10 (+8)	10 (+8)	10 (+8)	10 (+8)	6 (+3)	5 (+3)
FT11	4 (+2)	4 (+2)	3 (+2)	4 (+2)	4 (+2)	3 (+3)	3 (+3)
FT13	8 (+2)	9 (+2)	9 (+2)	9 (+2)	9 (+2)	2 (+2)	2 (+2)
FT14	9 (+7)	7 (+5)	7 (+5)	5 (+3)	5 (+3)	9 (+7)	7 (+7)
FT21	14 (+4)	16 (+5)	15 (+5)	17 (+3)	13 (+5)	14 (+5)	12 (+6)

	* 50%tile (mins)	Improvement from original	* 95%tile (mins)	Improvement from original
Original Allocation	14.68 - 15.47	-	79.70 - 91.03	-
Improved Allocation	10.12 - 10.56	31%	46.25 - 50.67	43%
Further Allocation	5.22 - 5.27	66%	21.70 - 21.92	75%

*After running 35 runs to get the 95% confidence interval

- Improved Allocation
 - No change in manpower strength.
 - Reallocation of full-time porters from 8am, 11am & 9pm shifts to 9am & 10am shifts
- Further Allocation
 - Significantly increase in manpower numbers
 - Response time unable to reach KPI
 - The 95% of the traveling time is already larger than 20 mins
 - Increasing manpower numbers alone will not be sufficient to meet KPI

Travel Time Distribution

