A Queuing Analysis for The Bridge Of The Americas (BOTA)

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Statement of Problem

- Long waiting times at the Bridge Of The Americas (BOTA) is a critical issue faced by El Paso-Juarez community

- This problem has a direct impact on the economy, environment and quality of life of this community
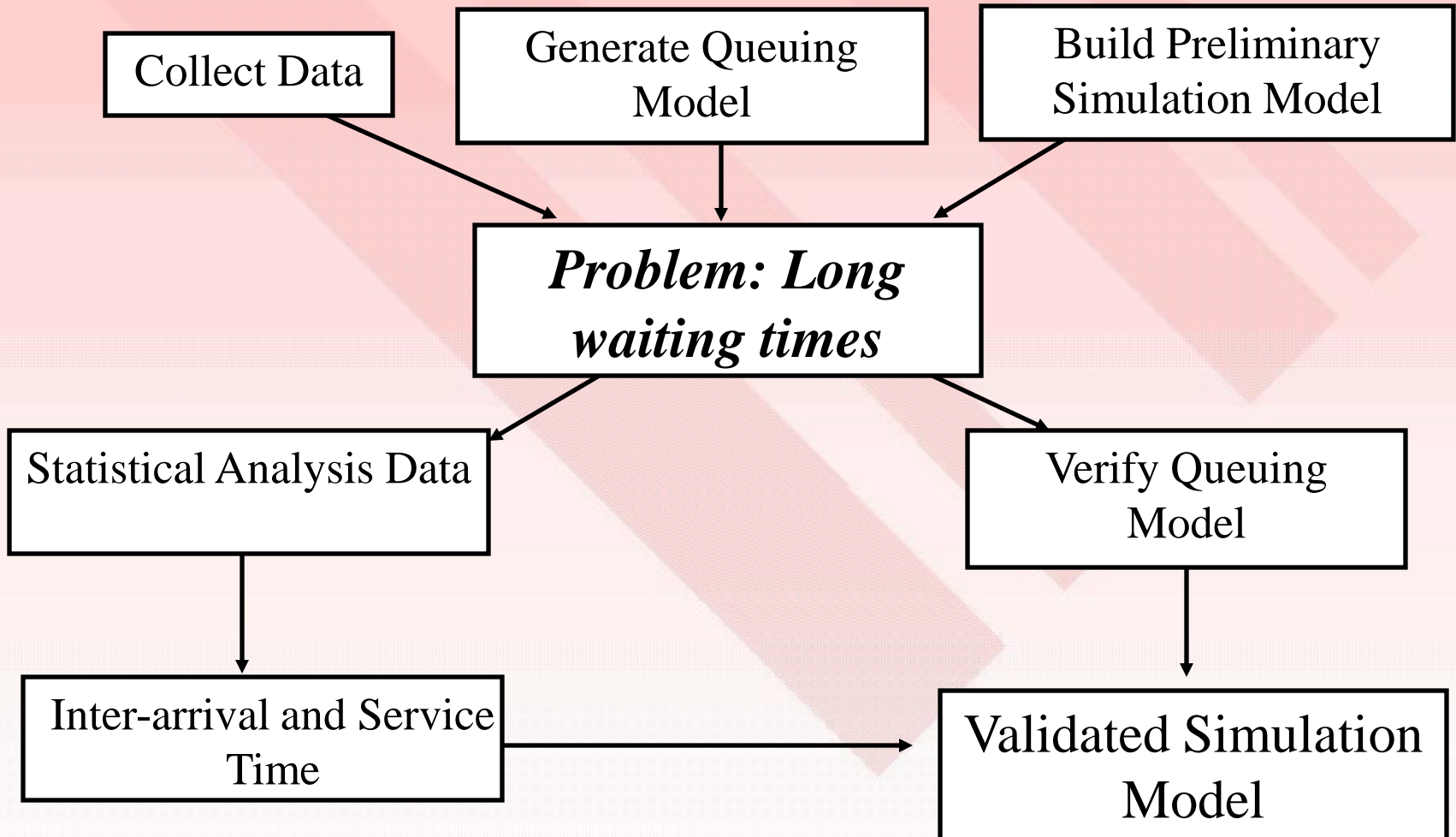
Proposed Solution

- Propose a more efficient use of the existing resources
- Create a set of rules that would help to accomplish the goal

Problem Structure

Collect Data

Generate Queuing Model

Build Preliminary Simulation Model

Problem: Long waiting times

Statistical Analysis Data

Verify Queuing Model

Inter-arrival and Service Time

Validated Simulation Model

Methodology

Inspection Types:

– Type I: Driver remains in car while officer ask regular questions

– Type II: Open trunk or officer taps the vehicle
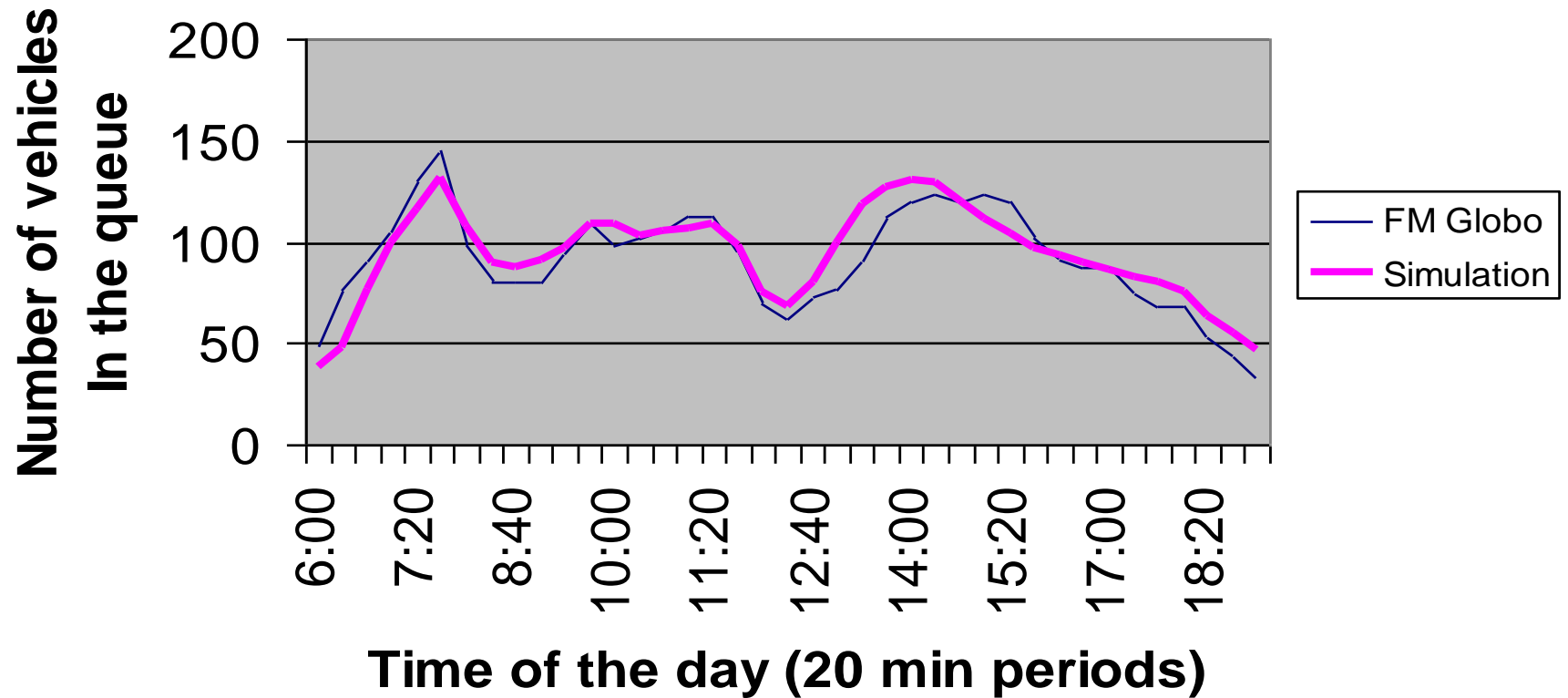
– Type III: Further inspection required

Methodology

- ## Arrival Pattern
  - Estimation using historical data

- ## Service Pattern
  - Collect Inspection Times (Videotape) at BOTA

Results

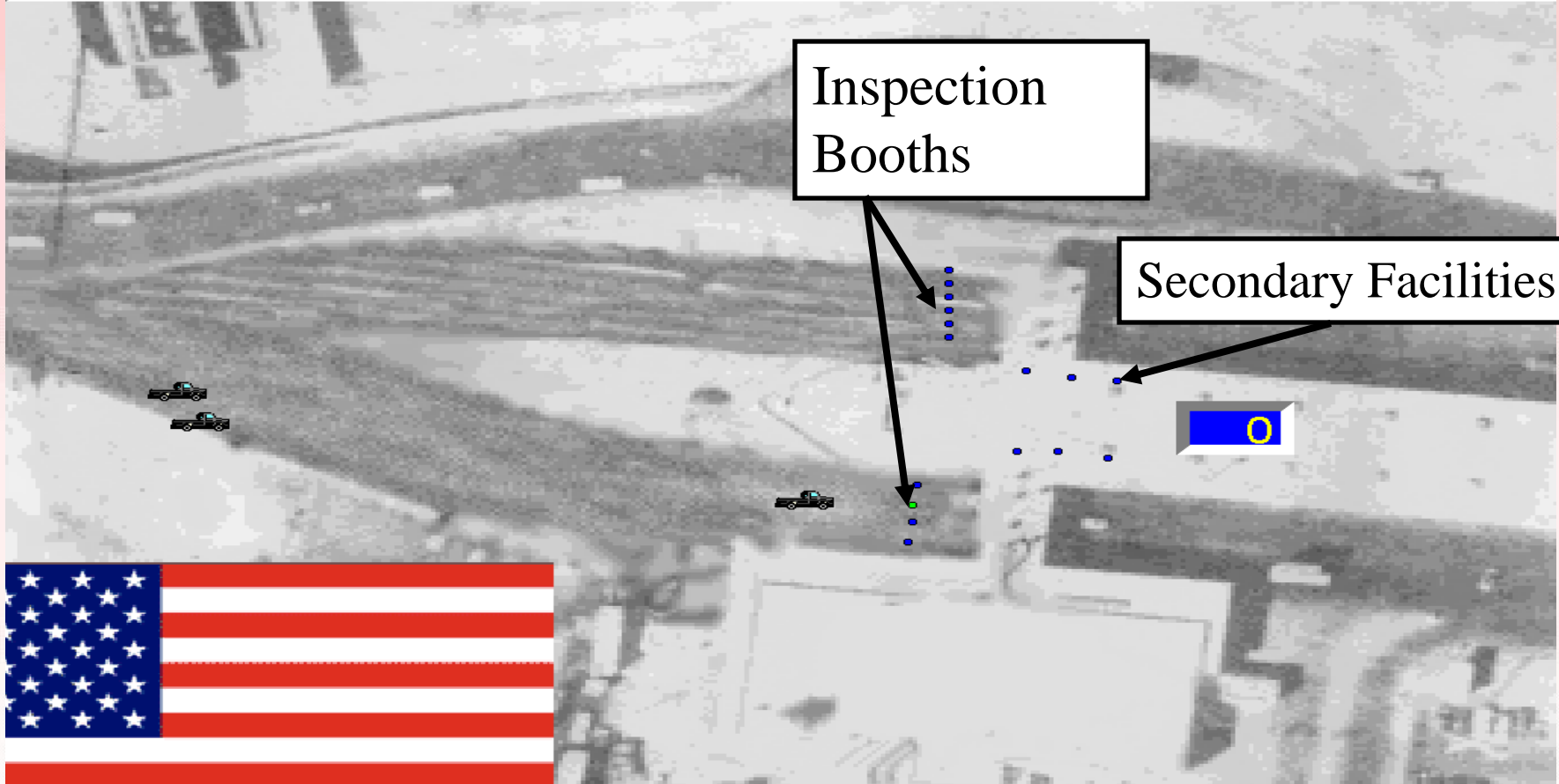Validation — Number of vehicles In the queue vs. Time of the day (20 min periods). Legend: FM Globo, Simulation.
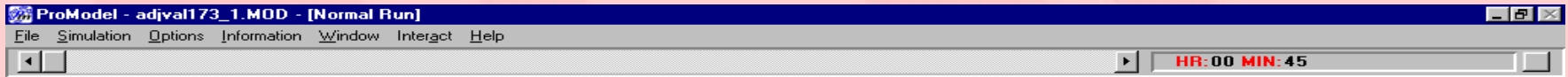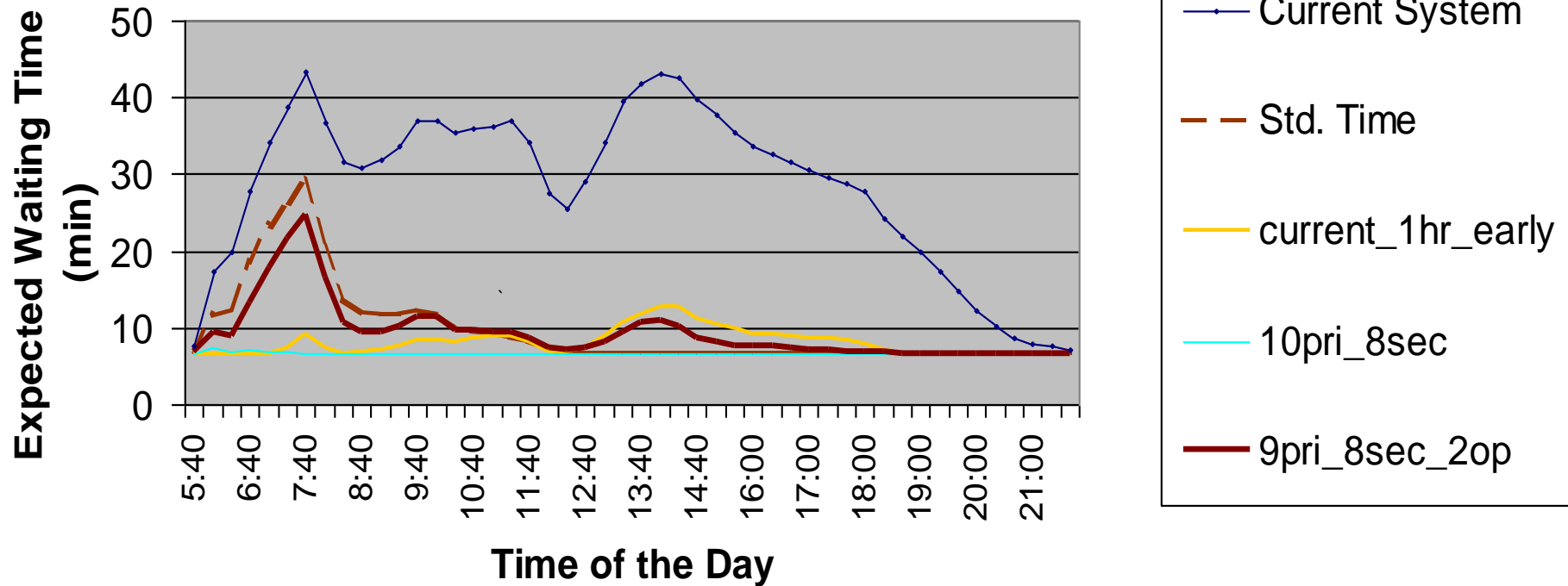
Results

Results

Current Alternatives

1. Standardization of Type I inspection time
   - Type I : 23 sec
   - Type II: 103 & 81 sec.

2. 10 Inspection booths open and 8 secondary facility spaces.

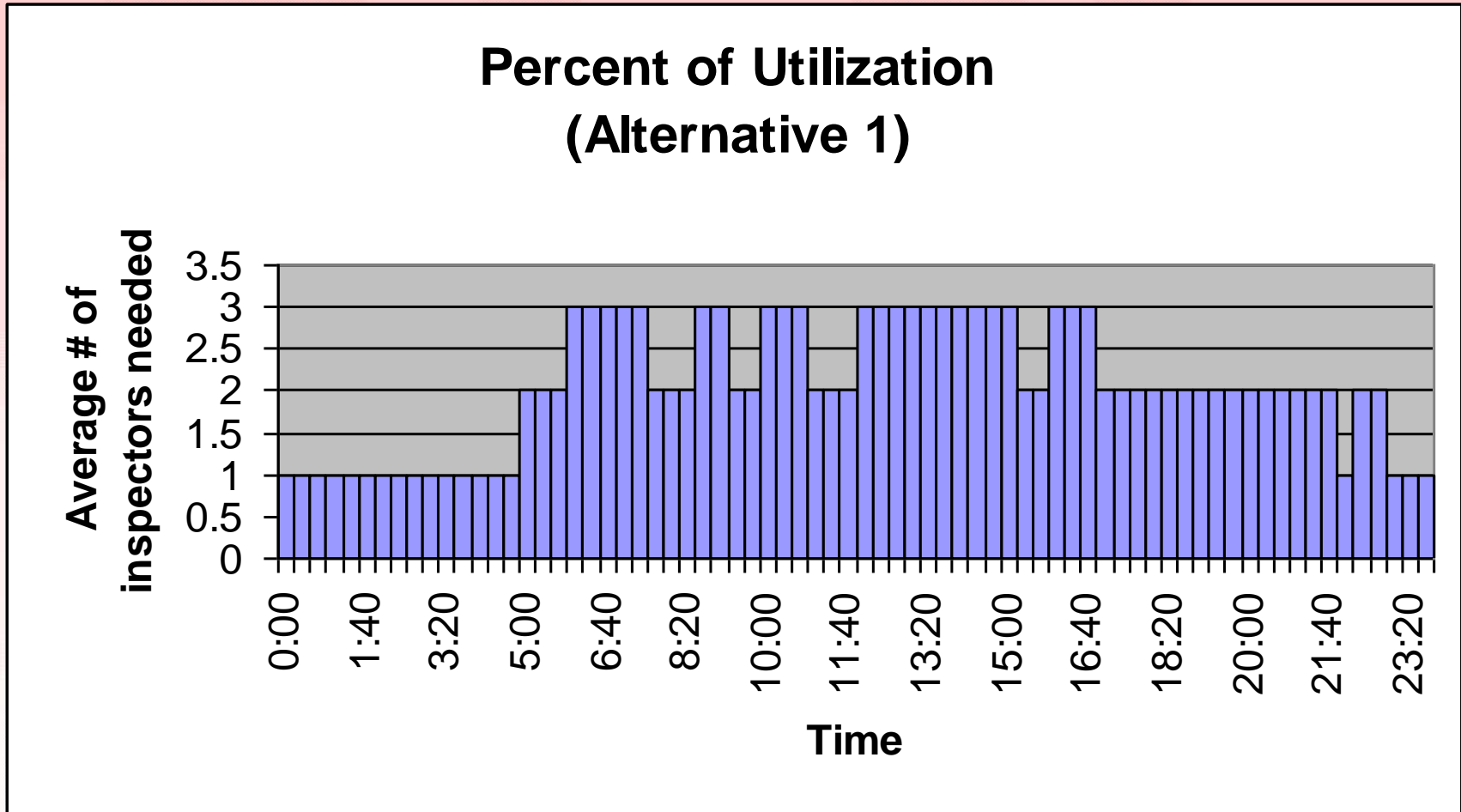3. 9 Inspection booths open with 8 secondary facility spaces (2 Officers).

Preliminary Results

Comparison of Alternatives

Preliminary Results

Percent of Utilization (Alternative 1)

Conclusions

- Conspicuous lack of information
- A methodology to analyze complex queueing systems was developed.
- The model developed is only a preliminary model to test methodology.
- Waiting Times at BOTA can be reduced significantly if existing resources are used more efficiently.

Caveats

- One week of information only (inspection times)
- Weekends not considered
- No reliable information on profile of arrivals
- Information on current percent of secondary inspection not available

Questions

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