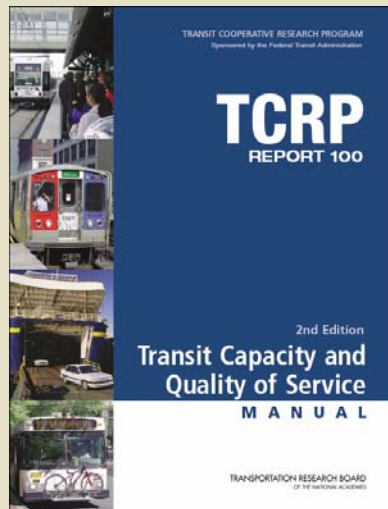


## Ferry Transit Capacity

Bill Carter  
Parsons Brinckerhoff



## Presentation Overview

- Brief introduction to the project
- Ferry facilities and service
- Vessels
- Ferry terminals
- Operations
- Capacity (current TCQSM method)
- Questions to think about



## Project Overview

- Obtain user feedback on the TCQSM 2<sup>nd</sup> Edition (2003)
- Recommend additions, revisions, format
- Conduct gap-filling research
- Prepare TCQSM 3<sup>rd</sup> Edition
- Prepare information program



## TCQSM Webinar Series Objectives

- Provide background on TCQSM material for focus group and online survey participants
- Expand industry's awareness of the manual and its potential uses
- Lay groundwork for updated training material when the new manual is published (2013)



## Webinar Series Topics

- Overview of the TCQSM 2<sup>nd</sup> Edition
- Fixed Route Quality of Service
- Bus Transit Capacity
- Rail Transit Capacity
- Ferry Transit Capacity
- Stop, Station, and Terminal Capacity
- Demand-Responsive Transportation



## Ferry Facilities and Service



## Ferry Facilities and Service

- Ferries provide are a significant transit element in many cities:
  - New York
  - San Francisco
  - Seattle
  - Vancouver BC
  - Boston
- Smaller communities
  - Nantucket - Martha's Vineyard
  - Victoria BC



## Many Systems Go Unnoticed

- Washington has:
  - Eight publicly owned ferry operators with 16 routes
  - At least 3 privately operated systems
  - Several tourist systems (excursions)



## Distinct Types of Ferry Service

- Mixed auto-passenger
- Passenger-only
- Water taxis

## Route Types

- Crossing bodies of water
- Island service
- Parallel to shoreline
- Two-stop routes
- Multi-stop routes

## Factors Unique to Ferry Service

- Tidal influence (ranges from minimal to 40 feet)
- Water body and shoreline
- Harbor congestion
- Weather (fog, wind)
- Vessels are usually one or few of a kind
- Berthing requirements vary by vessel class
  - Length, width, freeboard, door locations
- Island service requirements
  - Emergency, commercial, reservations, other



## Factors Unique to Ferry Service (cont'd.)

- Most trips are multimodal
- System lack of spare vessels
- Operation by non-traditional transit providers
- Regulatory environment (USCG)
  - Certificates of Inspection – Capacity
  - Crew size (dispatch problems)
- Security requirements
  - MARSEC Levels 1,2, and 3



## Ferry Vessels



## Ferry Vessels

- Vessel type determined by interrelated factors
  - Type of Service
    - Auto-passenger, passenger-only, water taxi
  - Required speed
    - Conventional or high-speed
  - Environmental factors
    - Seas, reliability
  - Operational costs
    - Speed-dependent

## Vessel Types

- Monohull
- Catamarans
- Small Waterplane Area Twin Hull (SWATH)
- Hydrofoils
- Surface effect
- Hovercraft

## Ferry Terminals





## Ferry Terminals

- Locations driven by destinations and marine conditions
  - Difficult shoreline issues – residential, CBD, industrial
  - Public access – views – aesthetics
  - Shoreline conditions
    - Water depth
    - Currents
    - Fetch & breakwaters
    - Marine traffic
  - Marine life

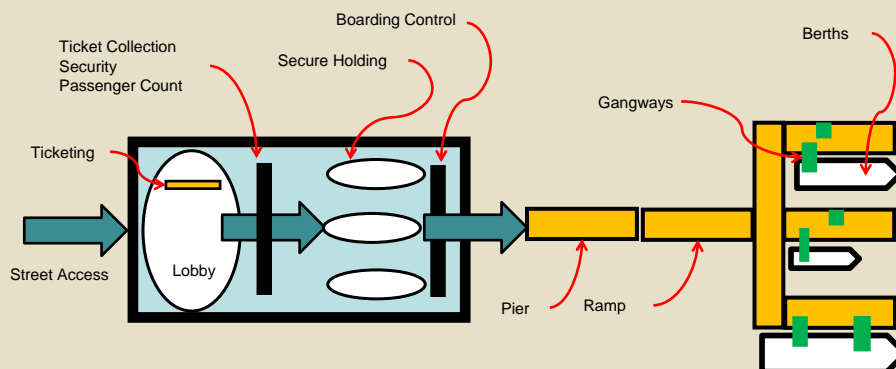
## Terminal Elements

- Street Access
- Terminal Building
  - Lobby (open queuing area)
  - Ticketing (fare sales)
  - Control (collection, passenger count, security)
  - Secure holding (security, pre-load)
  - Boarding control

## Terminal Elements (cont'd.)

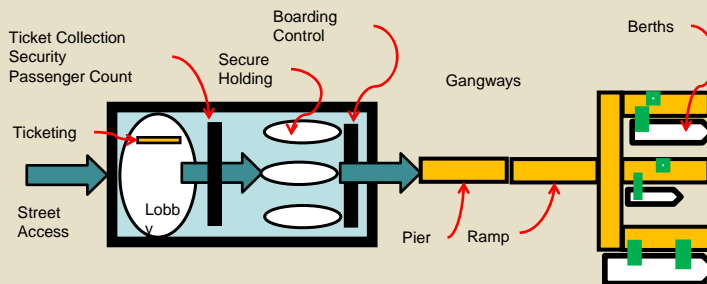
- Vessel Access
  - Pier (deep water)
  - Berth (mooring)
  - Ramp (elevation)
  - Gangway (access)

## Terminal Configuration Currently Addressed in TCQSM

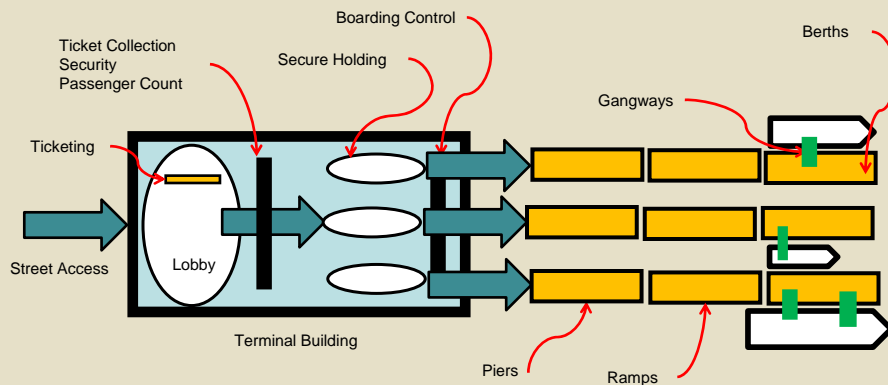


## Issues with Multiple Routes at a Single Terminal

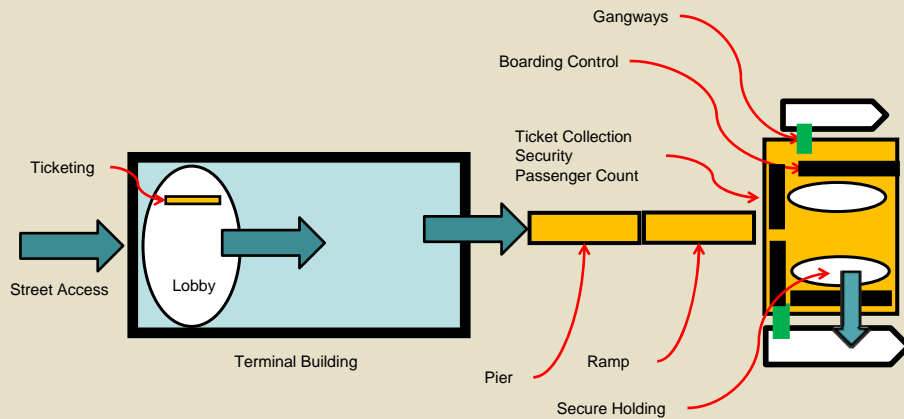
- Passenger control and separation by route
- Simultaneous vessel landings can occur
  - Embarkation and Disembarkation conflicts



## More Common Terminal Arrangement #1



## More Common Terminal Arrangement #2

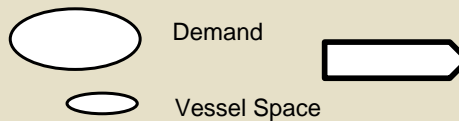


## Operations



## Routes and Crossing Capacity

- A route may have multiple stops
  - Passengers may or may not disembark at a stop
  - Passenger count is difficult to maintain
  - First-in first-out pre-staging passengers is difficult
- A crossing is between two points
  - All passengers disembark at each stop



## Capacity



## Current Capacity Method Inputs

- **Berth capacity**
  - **Arrival service time**
    - Vessel clearance time
      - Maneuver
      - Tie up
      - Gangway placement
    - Disembarking time
      - Passenger volume – bottleneck
      - Passenger walking times (vessel – holding area)

## Current Capacity Method Inputs (cont'd.)

- **Berth Capacity**
  - **Departure Service Time**
    - Embarking Time
      - Passenger Volume – Bottleneck
      - Passenger walking times (vessel – holding area)
    - Vessel clearance time
      - Gangway removal
      - Tie up
      - Maneuver

## Current Capacity Method Inputs (cont'd.)

- **Simultaneous disembarking and embarking**
  - May not be viable due to security requirements
  - Difficult at best—no control in a hazardous area
  - Passenger load control is difficult
- **Automobile embarking and disembarking**
  - Procedure included in TCQSM
  - Not addressed further in this presentation

## Current Capacity Method Inputs (cont'd.)

- **Dock capacity**
  - Sum of individual berth capacities
    - Number of vessels serving berth in an hour
    - Capacity of vessel serving berth
      - Note that not all vessels using berth may be identical
- **Route/crossing capacity**
  - Vessel frequency
  - Vessel passenger capacity
  - Peak hour factor
    - Accounts for any fluctuations in demand during peak hour

## Questions to Think About



## Questions to Think About

- How should the lack of standardization between operators be handled?
- Should ferry terminal information be added to the TCQSM's terminals section?
- Should discrete analysis of each element (ticketing, waiting area control, boarding control, etc.) be substituted for a more general approach?
- Should the manual contain information on auto capacity?



## We Want Your Input on the TCQSM!

- Take our online survey to help shape the 3<sup>rd</sup> Edition's content
- Stay involved with the project
  - Give us your e-mail address after completing the survey and we'll keep you informed of future opportunities to provide input
- Do you go to the Transportation Research Board's Annual Meeting?
  - Attend the meeting of the Transit Capacity and Quality of Service Committee (AP015)

