Why is Mobility Important?

Global Population: 80% predicted to reside in an urban environment by 2050

“Ensuring urban areas are fluid and mobile is fundamental...”

Why is Mobility Important?

Industry Trends

- Growing prosperity creating a growing demand for mobility
- Definite movement towards ‘multimodal’ services combining walking, cars, buses, cycles and trains
- Transit Oriented Developments becoming more relevant

Pain Points

- Cities are challenged by increasing problems caused by traffic and transportation
- Existing urban infrastructure cannot support the predicted increase in vehicles on the road.
- Growing cost of congestion problems
- WHO estimated 7 million premature deaths attributable to air pollution and urban transit
Who?

1. Crowd Simulation and Evacuation Modeling
   a) Local Authorities
   b) Any ‘Campus’
      i. Ports
      ii. Airports
      iii. Universities
      iv. Commercial Businesses
   c) ESPs / Specialists

2. Traffic Systems
   a) Local Authorities
      i. Traffic Engineers
      ii. Transportation Analysts
   b) ESPs / Specialists
Why Now?

1. **Urban mobility is becoming more important to cities**
   a) Congestion close to unbearable in some cities, costing as much as 4% of national GDP
   b) Lost time, wasted fuel, increased cost of doing business

2. **Cities looking for sustainable transportation solutions**
   a) Cities targeted on environmental factors relating to transportation
   b) Transit Oriented Developments
   c) Electric vehicles

3. **COVID-19**
   a) Governments need containment of the virus
   b) Companies need to provide a safe working environment for their workers
Mobility Simulation
COVID-19 Considerations and Application
COVID-19 Considerations and Application

- Features, settings and parameters useful in modelling simulation specific to COVID-19 planning

- General Considerations

- Technical Implementation
  - People Parameters
    - Spacing
    - Queuing
What has Changed?
Flow, Capacity, Ingress and Circulation

- Occupancy/Space
  - Office – old occupant loadings (e.g. 6m²/person) no longer apply
  - Retail – stores to accommodate fewer people – also Restaurants
  - Schools - smaller class sizes
  - Productivity per unit area is reduced – Value of space
What has Changed?
Flow, Capacity, Ingress and Circulation

- Route planning
  - The extra spacing: Door & Passage capacity
  - Understanding and measurements of one-way flow needs to be further developed
  - A reduction of crossing flows
  - Partitions must be considered
What has Changed?
Flow, Capacity, Ingress and Circulation

- “Risk”
  - Life safety, fire protection and evacuation
  → Infection and Transmission

- This might rebalance over time
What has Changed?
Flow, Capacity, Ingress and Circulation

- Speed/Flow
  - Walking speeds unchanged (e.g. 1.4 m/s)
  - The enforced spacing → Lower flow rates
  - Longer load and unload time
General Measures

COVID-19 Mitigation

- Physical Distancing
- Uni-direction Flow
- Dedicated Parking
- Assigned Entrance / Exit
- Staggered Arrival / Departure Times
Mobility Simulation

Network Design

- Network Layout
  - Uni-direction Person Flow
  - Parking
  - Entrance / Exit

- People Parameters
  - Physical Distancing

- Walkway Parameters
  - Physical Distancing
Mobility Simulation

Person Parameters
Mobility Simulation

Walkway Properties
Mobility Simulation
Airport Example – COVID-19

- Consider 3 Conditions
  - Normal ‘Pre-COVID’ Conditions
  - Physical Distancing Implemented
  - Physical Distancing PLUS Infrastructure Changes
Airport
Mobility Simulation
Retail Example – COVID-19

- Consider 3 Conditions
  - Normal ‘Pre-COVID’ Conditions
  - Physical Distancing Implemented
  - Physical Distancing PLUS Infrastructure Changes
    - Unidirectional Flow
Retail
CFD Air Simulations
For better and safer indoor air quality
Air Simulation
“Facts are better than dreams”
- Winston Churchill -