Introduction to Pedestrian dynamics:

First few questions, and history: 20 mins.

1. How do you design an Olympic village to accommodate 100,000 people. What happens if 200,000 turn up?
2. How do you future proof Crossrail for the increasing population of London?
3. What do you do in the zombie apocalypse? What do other people do?

Aims: 10 mins

Aims of this course:

Intended Learning Outcomes of this course:

Intro: 30 mins

History:

Accommodating people is one of the major design problems for macro-scale (read: bigger than building sized) engineering projects. This is a relatively young engineering industry, having been significantly improved by the computational explosion and Moore’s Law.

In the 50s: Who?

In the 70s and 80s: Fruin, Predtechenskii…

In the 90s: Helbing

In the 2000s: All sorts of rubbish

In the 10s: All more sorts of rubbish.

Basic hand calculation approach: hydraulic model: rundown, intro to examples, intro to python code

showcase videos of different simulation models: massmotion, pathfinder, steps, simulex, fds evac.

How do you do this?

Further questions:

how can we design this?

How can we retrofit current designs to make improvements?

What do we need to know to make reasonable models?

Data analysis and generation methods

Simulation

Psychology

Physiology: step length, fitness levels, typical anatomy and morphology. Density estimations.

Learning and cognitive processes

Building design and codes

Workshop: 2hours

Data gathering: walking speed of people in class at different densities. Individuals, individuals in a group (tie them with rope?). 20 minutes. Build ‘fundamental’ diagram.

Densities: 0, 1, 2, 3.

Hydraulic model, example 2. First order, second order. Work in groups. 45 minutes,

present answers to class. 15 mins

Mentimeter poll: 5 minutes.

Intro to rundown of remaining lectures (flipped classroom, mentimeter polls, BB assessments). 10 mins

Examples: the who concert. We are fstv bbc link

<https://en.wikipedia.org/wiki/The_Who_concert_disaster>

<https://www.bbc.co.uk/news/newsbeat-48410269>