



**ORBITZ**  
ELEVATORS  
YOUR LOCAL CUSTOMER SERVICE EXPERTS

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# Equitable Egress

Managing the People in an  
Evacuation

by

Greg North



# Equitable Egress

- Management
- Training
- Other Features of Consideration



# Equitable Egress

- Management
- Training
- Other Features of Consideration ... *it not only about lifts*



# Equitable Egress

- Management
- Training
- Other Features of Consideration ... *it not only about lifts*
- Holistic Design thoughts



# Management

- *design + management = complete answer*



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- Management influenced by...



# Management

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- Management influenced by...
- Lift options:
  - auto controlled vs remote controlled vs driver controlled





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- Building management options:
  - permanently managed vs intermittently managed vs unmanaged



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... a healthcare example



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- Management influenced by...
- Lift options:
  - auto controlled vs remote controlled vs **driver controlled**
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... a healthcare example

*(FYI ... inspections and maintenance important too!)*



# Management - healthcare example

- Evacuation requires dynamic emergency management with proactive decision-making by staff



# Management - healthcare example

- Evacuation requires dynamic emergency management with proactive decision-making by staff



# Management - healthcare example

- Evacuation requires dynamic emergency management with proactive decision-making by staff
- What is the right way to move people requiring assistance?
  - 1 person + 1 staff (start to finish)
  - 1 person + multiple staff (staged movement)



# Management - healthcare example

- Primary Lead Fire Warden
- Lift Warden
- Receiving Floor Fire Warden





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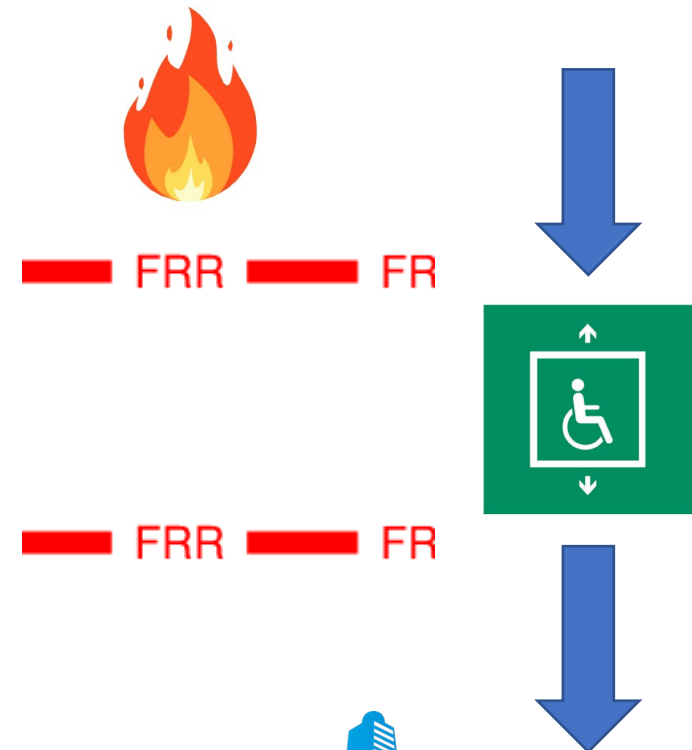
FRR — FR

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# Management - healthcare example

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# Management - healthcare example

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# Management - healthcare example

- Building owner / stakeholders engagement
    - When?
    - What will work?
    - What won't work?
  - Adequacy of Information
- >> Enable Emergency Management Planning and Policymaking to occur



# Management - Information

- Clear information to public and staff



wayfinding signage – needed? where?



CH

Positive and negative reinforcement signage – needed? where?

# Management - Information

- Clear information to public and staff
- Clear communications
  - What? Why? How? To who?
  - Audio + Video

... what management strategies are required?



wayfinding signage – needed? where?



Positive and negative reinforcement signage – needed? where?

# Management - Information

- Clear information to public and staff
- Clear communications
  - What? Why? How? To who?
  - Audio + Video

... what management strategies are required?

What do you do with the information ...



wayfinding signage – needed? where?



Positive and negative reinforcement signage – needed? where?

# Management - Training *the key to success*

- Training of person requiring assistance
- Training of staff assisting





# Management - Training

- Training of person requiring assistance
- Training of staff assisting

... Training dependent on

- Lift options:
  - auto controlled vs remote controlled vs driver controlled
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# Management - Training

- Training of person requiring assistance
- Training of staff assisting

... Training dependent on

- Lift options:
  - auto controlled vs remote controlled vs driver controlled
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# Management - Training

- Training of person requiring assistance
- Training of staff assisting

## Training considerations

- What's the training qualification to get?
- Who's qualified to give the training?
- Frequency of training?



# Management - Training

- Training of person requiring assistance
- Training of staff assisting

... How do you test the feature

- Regular realistic trial evacuations



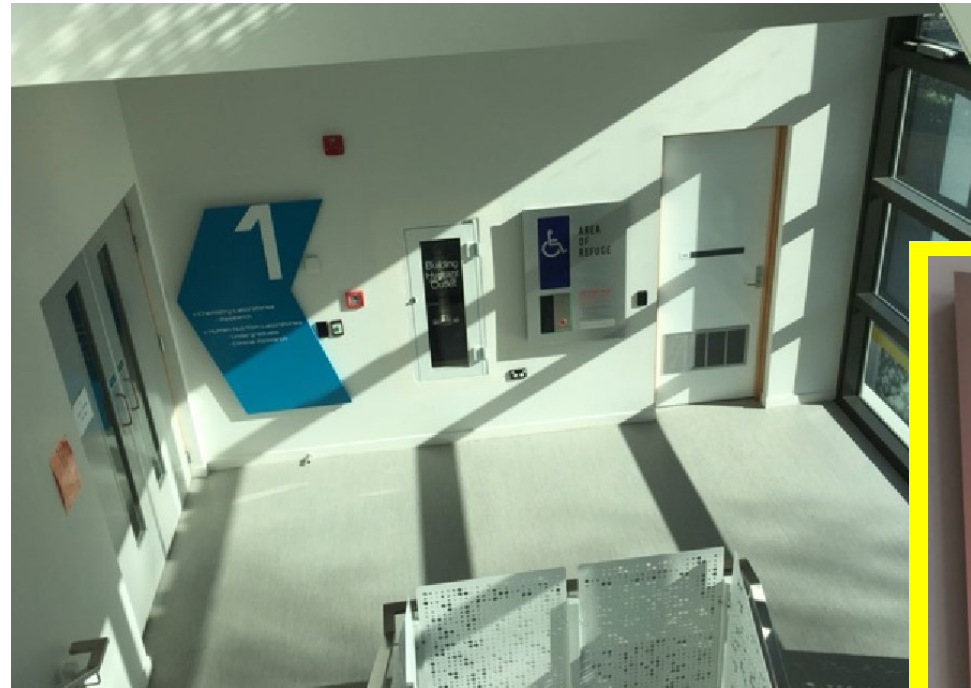
# Other Features of Consideration

- Complementary devices
- Alternative devices



# Other Features of Consideration

- Area of Refuges  
(EN81-76 = 'safe area')
- A temporary place of safety vs internal place of safety



# Other Features of Consideration

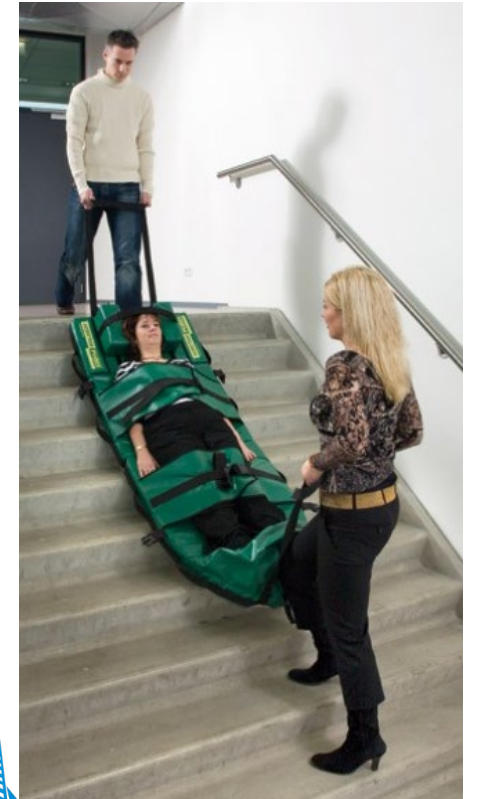
- Visual Alerting Devices
  - Permanent hearing impairments
  - Temporary hearing impairments
- To nominate as fire alarm Declared Functional Requirement



# Other Features of Consideration

- Movement Aids

Evac Chairs  
Skid Sheets  
Wee Vac  
Backboard  
Stretchers  
Hoists



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BUILDING  
COMPLIANCE

**ABC**  
TECH



# Other Features of Consideration

- Movement Aids
- Implications: pros and cons
  - movement up and down stairs
  - number of staff required
  - discriminatory ?
  - connected clinical equipment (charts, baby food, clinical equipment)
  - cost
  - storage
  - cleaning
  - product lifespan
  - product maintenance/inspection



# Other Features of Consideration

- Movement Aids
- How do these options compare with an Evacuation
- Implications: pros and cons
  - movement up and down stairs
  - number of staff required
  - discriminatory ?
  - connected clinical equipment (charts, baby food, clinical equipment)
  - cost
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# Holistic Design thoughts

*lifts enable earlier, safer, and easier patients movement than would traditionally be permitted in buildings when only stairs are available.*

- Safety of stairs vs lifts (robustness)
- Not 100% safety ... stairs are important (redundancy)



# Holistic Design thoughts

*lifts enable earlier, safer, and easier patients movement than would traditionally be permitted in buildings when only stairs are available.*

- Safety of stairs vs lifts (robustness)
- Not 100% safety ... stairs are important (redundancy)
- Avoid single points of failures
  - Strategic placements (separate cores across floorplate)
  - Elemental (consider key components of each design)



# Holistic Design thoughts

- Think beyond the 'final exit' ... where will people be safe?
  - Landscaping
  - Security
  - Lighting
  - Route Design
- Swimming pool ... towels, footwear?
- Human behaviour / abilities ... childcare, aged care
- Medical requirements ... healthcare



CH

# Holistic Design thoughts

- Think beyond the 'final exit' ... where will people be safe?  
...when to do this

CIC Guidelines

## Concept Design

**Building Services:** Consider concept options and include in design.

**Vertical Transportation:** Consider options, include in design.

**Fire:** Consider concepts and principles of fire protection, egress and NZFS access.

**Accessibility and facilities for people with disabilities:** Consider and incorporate requirements.

**Floor Areas/Schedule of accommodation:** Schedule/outline based on current drawings/model



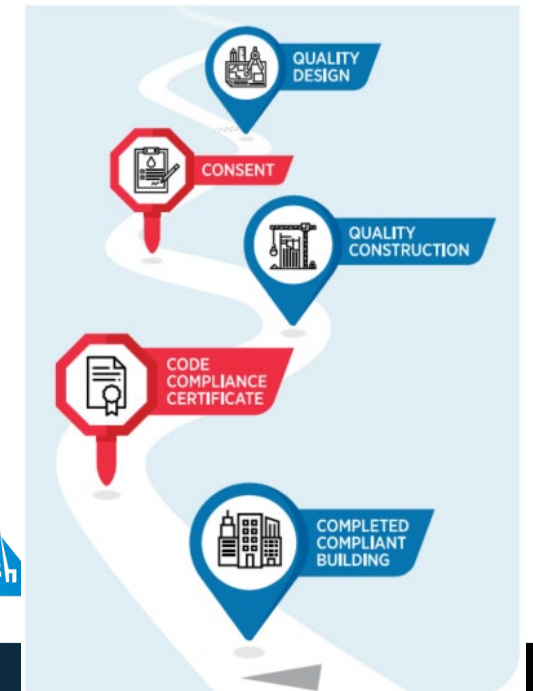
# Holistic Design thoughts

- Think beyond the 'final exit'
- What is equitable for staff and people requiring assistance
  - Being limited to a certain floor / space?
  - Being moved out of your wheelchair?



# Holistic Design thoughts

- Think beyond the 'final exit'
- What is equitable for staff and people requiring assistance
- Explore long term building use + operational expectations





# Holistic Design thoughts

- Think beyond the 'final exit'
- What is equitable for staff and people requiring assistance
- Explore long term building use + operational expectations
- Engage with the project team incl the Evac consultant as relevant
  - Convey Equitable design options



# Holistic Design thoughts

- Think beyond the 'final exit'
- What is equitable for staff and people requiring assistance
- Explore long term building use + operational expectations
- Engage with the project team incl the Evac consultant as relevant
- Engage with the building owner / operator so they understand the implications / risks of key decisions



# Holistic Design thoughts

- Think beyond the 'final exit'
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*Remember, one day YOU or YOUR FAMILY may be the ones needing a more equitable design solution*



# Final note

Greater London Authority  
London Plan Guidance Sheet  
Policy D5(B5)

## Evacuation Lifts

1. Policy D5 of the London Plan requires the highest standards of accessible and inclusive design to be met, stating:

"3.5.2 Inclusive design is indivisible from good design. It is therefore essential to consider inclusive design and the development's contribution to the creation of inclusive neighbourhoods at the earliest possible stage in the development process - from initial conception through to completion and, where relevant, the occupation and on-going management and maintenance of the development."

2. Policy D5(B5) requires development proposals to be:

5) ...designed to incorporate safe and dignified emergency evacuation for all building users. In all developments where lifts are installed, as a minimum at least one lift per core (or more subject to capacity assessments) should be a suitably sized fire evacuation lift suitable to be used to evacuate people who require level access from the building."

**London Plan Policy D5(B5) is applicable to all development proposal applications.**

Greater London Authority  
London Plan Guidance Sheet  
Policy D5(B5)

### Annex A - Residential scenario

#### Residential developments

- A1. London Plan Policy D5(B5) requirements extend to all development proposals, including residential developments. The requirement for the provision of evacuation lifts within residential properties represents a commitment to ensure the highest standards of accessible and inclusive design are considered across the built environment within London.
- A2. Typically, the use of evacuation lifts requires the manual intervention of suitably trained, competent persons. It is recognised that such persons may be absent from some residential developments. In the event that the building designer identifies the absence of competent persons to facilitate the evacuation strategy in a residential building; alternative measures should be detailed. In this scenario the requirements of D5(B5) still apply and it is the duty of the building designer to explore suitable alternatives to meet the policy requirements. See the example below.

#### Evacuation lifts within residential developments

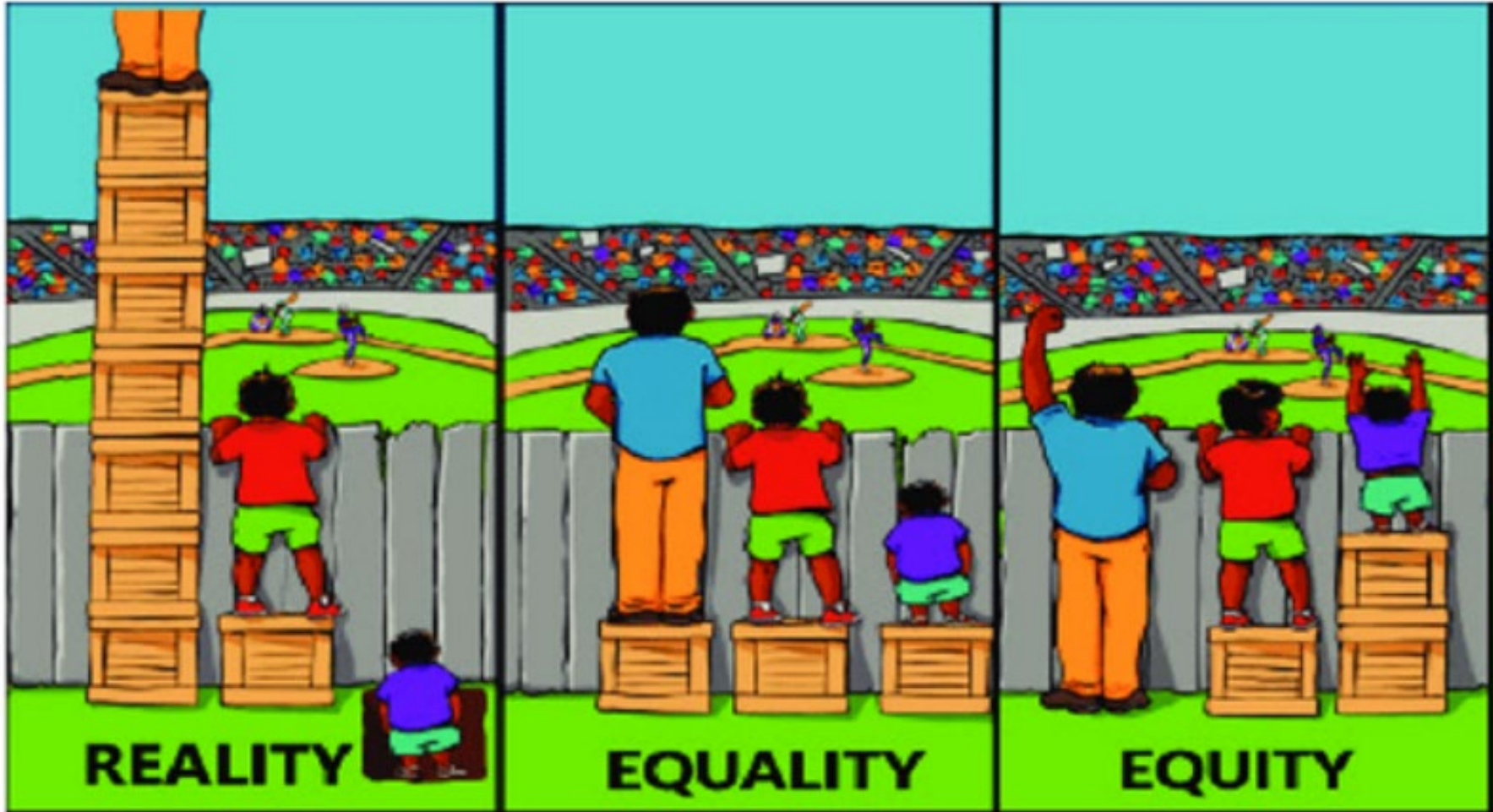
Evacuation lifts can be installed to operated utilising the following three methods:

- Driver assisted evacuation
- Automatic evacuation
- Remote assisted evacuation

Where a development proposal is categorised as residential, and there is an absence of competent person allowing for a driver assisted evacuation, an alternative operation method should be considered.

Alternative evacuation lift types suitable for residential premises that do not require competent persons to be present should be clearly outlined within the Fire Statement or the Inclusive Design Statement as per Policy D5(B5)). The information provided should detail how the overall evacuation strategy will be supported.

**NOTE:** Remote assisted evacuation technology is in its infancy and still being developed at the time of publication, featuring in draft standards rather than fully adopted standards.



**REALITY**

**EQUALITY**

**EQUITY**



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Dr. Peter Thompson  
Senior Research Engineer



UNIVERSITY OF  
CANTERBURY

*Te Whare Wānanga o Waitaha*  
CHRISTCHURCH NEW ZEALAND



**Human behaviour & crowd movement modelling:**  
*a brief introduction to our project & the future*

# 3 year project: “Changing evacuation behaviour to meet densified housing needs for our current and future population”

- ✓ **develop a new crowd movement model**  
which will integrate demographics, walking-ability, biomechanics research, complex flows. Building on, and expanding an existing high-density model.
- ✓ **connect the model with latest BIM design tools**  
to support an efficient, modern workflow; directly from architect’s designs.
- ✓ **study lift-evacuations for mixed-ability occupants**  
where VR experiments will inform official guidance on safe escape
- ✓ **create design guidance**  
using the knowledge gained from experiments and modelling
- ✓ **ensure quality through an advisory board of experts**  
so that the tools and documentation are “fit for industry” & work for our consultants

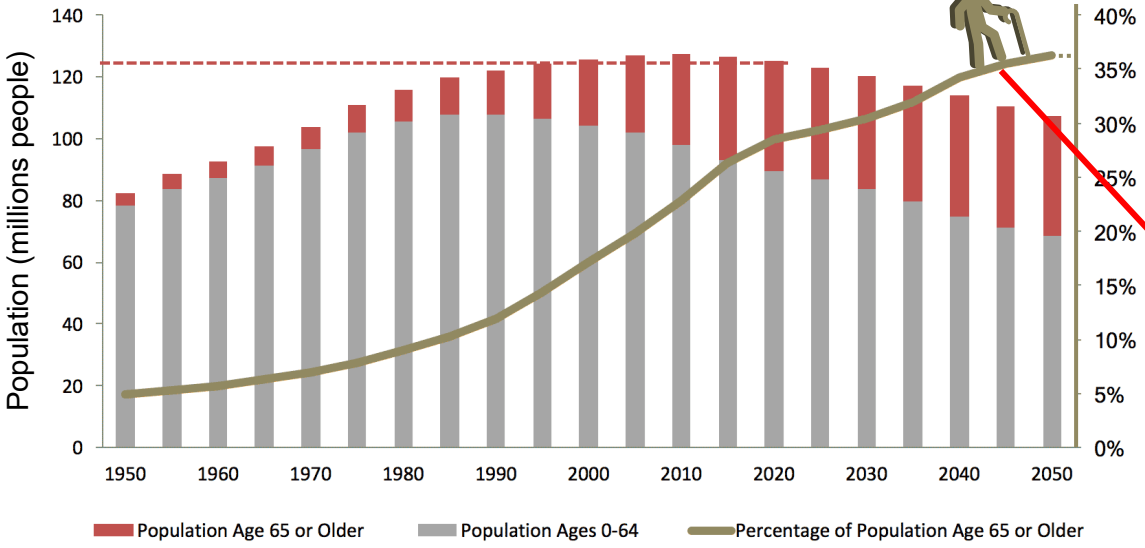


# Why develop a new crowd model?

Current design tools are functionally limited & don't reflect the impact of demographic change

...limiting analysis for life safety in future scenarios

Populations are proportionally MUCH older

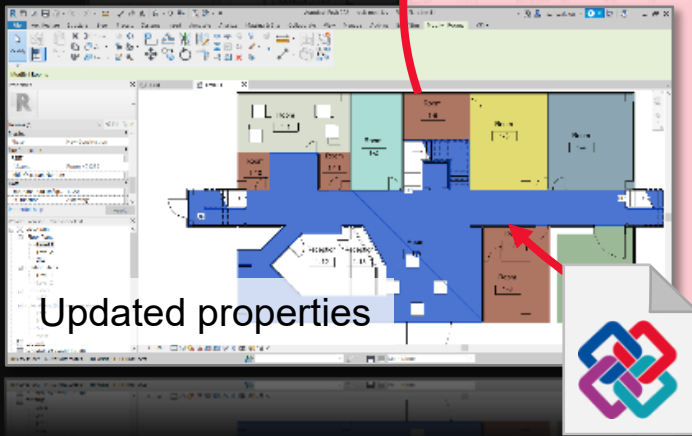
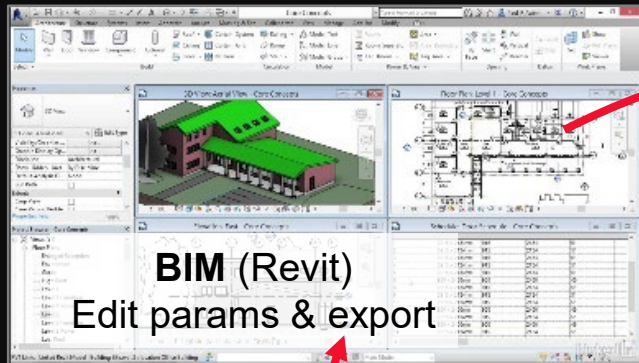


- ✗ Can't model high density crowds
- ✗ Inconsistent modelling for counter & cross-flows
- ✗ Poor inclusion of mixed-ability populations
- ✗ Not connected to modern 3D design tools (BIM)



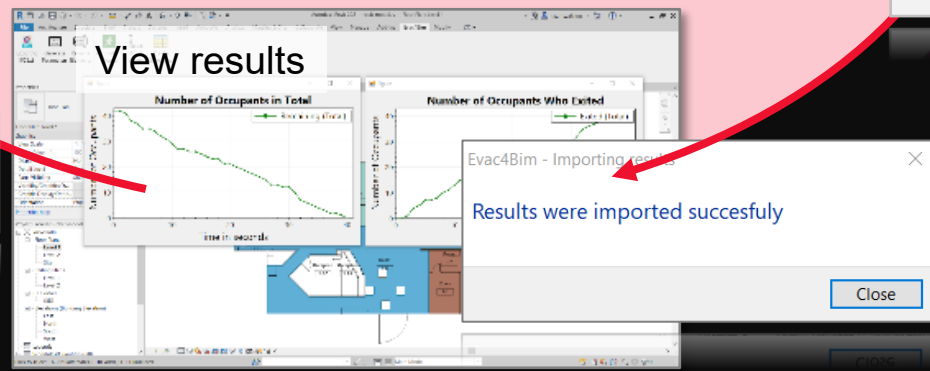
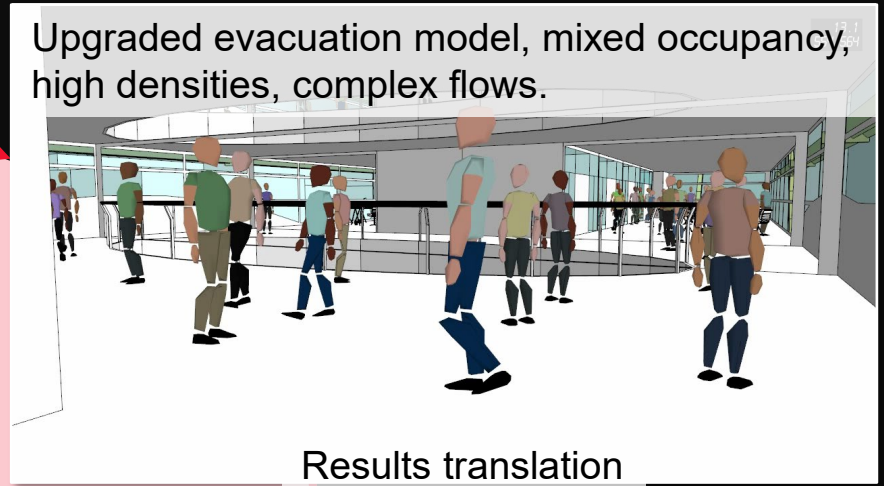
# Combining BIM and the “new” pedestrian model 50

BIM add-ins, feeding occupant movement BIM data into simulation tools, and back again



**Coming: 2 new BIM standards:**

- 2023 Occupant Movement Analysis
- 2026 Fire Safety Engineering



# Summary - what will we deliver?

*Changing evacuation behaviour to meet densified housing needs for our current and future population*



## Software tools:

- **BIM add-in**  
to integrate pedestrian movement parameters within the BIM model
- **“Next-generation” pedestrian model**  
to incorporate mixed-ability populations, high densities, complex flows
- **OpenSource code repository**  
Source code open for inspection/collaboration on github (or similar)
- **(related) International BIM standards**  
Input into Occupant Movement MVD and Fire Safety Engineering MVDs, working with external projects at buildingSmart International & Greenwich University



## Vertical evacuation:

(for Daniel, later today)

- **Virtual Reality testing**  
using the VR lab at Canterbury University
- **Publications**  
outcomes from the research and investigations
- **Guidance documents**  
Guidance for occupant notification systems for Occupant Evacuation Elevators (OEE) and Areas of Refuge (AoR)
- **Conferences/symposia**  
Broadcasting the project to the wider international forum

End

Questions?