The Unintended Consequences Of A Sustainable World

A Property Claims Perspective

Paul Redington BA(Hons) ACII
Regional Major Loss Manager
Zurich Insurance UK

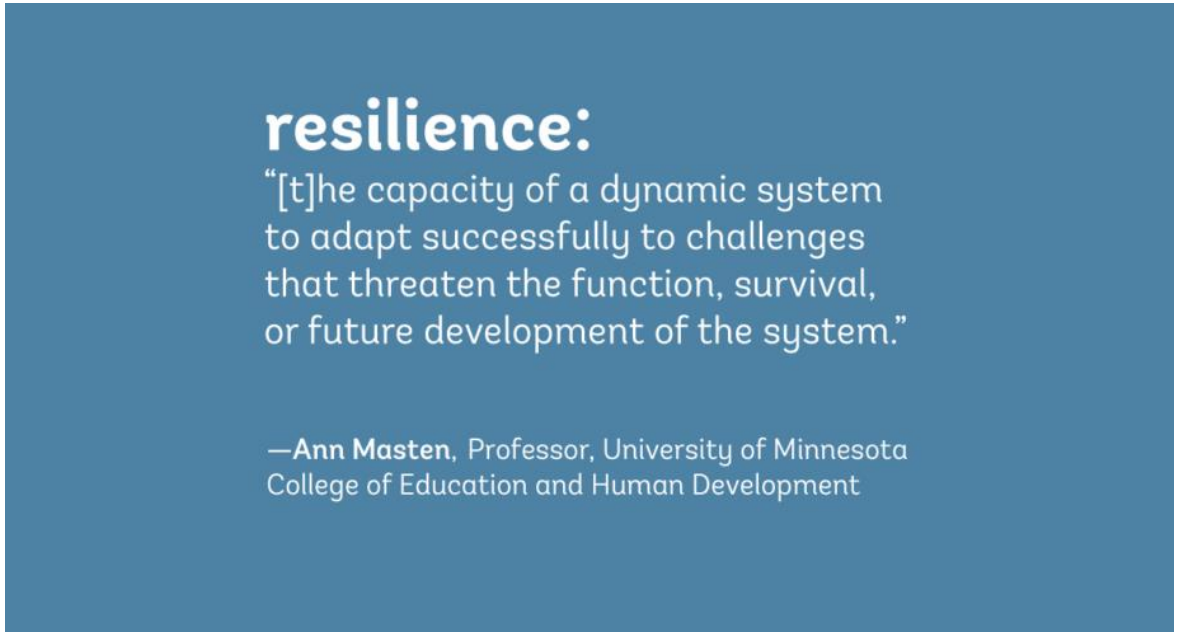
Learning Objectives

By the end of this session attendees will be able to:

- **Appreciate the challenges involved in balancing sustainability and resilience**
- **Understand the types of building products and construction technologies being deployed as we strive for a more sustainable world**
- **Understand the potential risks associated with the deployment of these products and technologies**
- **Articulate the ways we can eliminate or mitigate those risks, to ensure a more sustainable AND resilient future**

Sustainability & Resilience – Is there tension?

- **Susceptibility** of a building to being involved in a fire event
- **Vulnerability** of a building to damage from fire
- **Recoverability** of a building from fire damage



Some Typical/Traditional Causes Of Fire

Hot Works

External & internal contractors

Re-roofing

Plumbing / services

Deliberate/Criminal

Waste storage

Accelerants

Other criminal activity

Electrical faults

Faulty appliances/fittings

Ageing installations

Additional loads/circuits

Accidental / Other

Barbeques

Smoking

Cooking

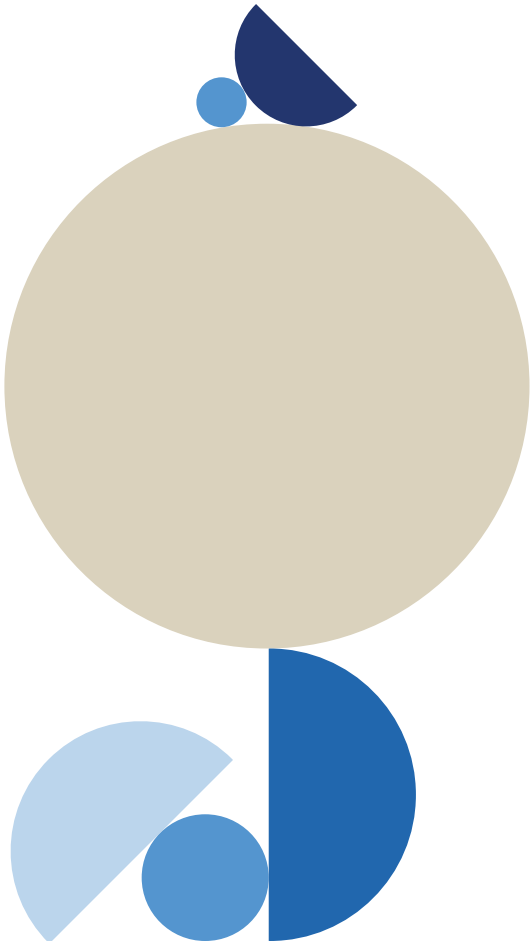
Candles

Case Study

Fire affecting the 7th and 8th floors of a residential block of flats

A roof terrace, only accessible by residents, was on the 7th floor

1 wall of the terrace, rising to the 8th floor, was a green wall.



Green Walls

Wildfires – Just an Overseas Issue?

CNBC

ENVIRONMENT

Warming climate, population sprawl threaten California's future with more destructive wildfires

PUBLISHED SAT, NOV 9 2019•9:30 AM EST


John W. Schoen
@JOHNWSCHOEN

Jordan McDonald

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Evening Standard

News › World

Australia bushfires: At least three dead and more than 100 homes destroyed as devastating blazes ravage east coast

PATRICK GRAFTON-GREEN | 25 minutes ago | 0 comments

The UK has already had more wildfires in 2019 than any year on record

ENVIRONMENT 23 April 2019

By Adam Vaughan

The New Scientist

Wildfires On Our Doorstep

Wildfires On Our Doorstep - August 2022

PV or Not PV? – That is the question

[Risk Insight: Roof Mounted Photovoltaic Panels and Systems (zurich.co.uk)]

The Drive For A Greener Planet

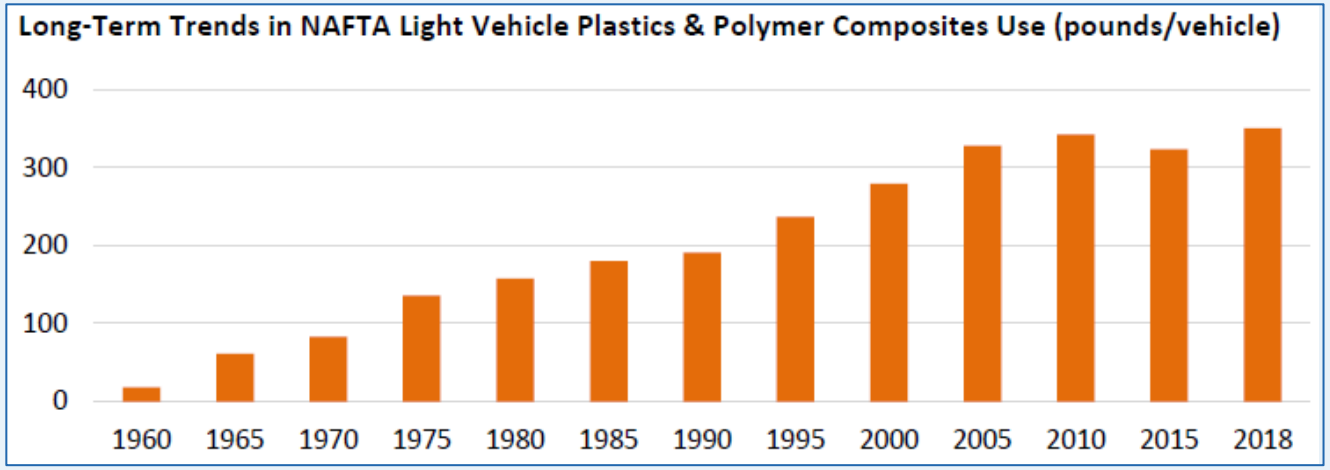
Current Trends…

1.) Increase in Plastics Utilised in Vehicle Design

Plastics are easily moldable, cheap, weather resistant and lightweight BUT are **highly combustible…**

Using plastics in vehicle production supports Cost reduction, improved fuel consumption….

New cars today have c. **150kg of plastics per Vehicle** which equates to 50% of total volume…



2.) Electric Vehicles and Charging Requirements

In 2021, **1.65m new vehicles** were registered in the UK…

Of these, **190,000 (11.5%) were Electric Vehicles** (EV's) and **115,000 (7%) were hybrids**…

Therefore, c. **20% of all new vehicles in the UK require EV charging**, with this number only increasing year on year…

Loss Example 1 – Kings Dock, Liverpool, 2017

CAR-MAGEDDON Apocalyptic images show fire-ravaged Liverpool car park after 1,000C blaze vaporised the floor

https://www.thesun.co.uk/news/5243011/liverpool-arena-fire-horse-show-range-rover-stables-sprinklers-damage/

Loss Example 2 - Górczewska 181, Warsaw, 2020

https://www.eurosprinkler.org/major-underground-car-park-fire-in-warsaw/

There are other examples too…

Location name	City	Country	Date of fire	Car park type	Number of cars involved in fire
Kings Dock	Liverpool (*)	UK	2017/12/31	Open-side, aboveground, reinforced concrete, freestanding (building demolished)	1,200
King's Plaza	Brooklyn, NY	USA	2018/09/17	Open-side, aboveground, reinforced concrete, attached to retail stores	135
Douglas Village Shopping Center	Cork	Ireland	2019/08/31	Open-side, aboveground, exposed steel, attached to retail stores	60
Sola Airport	Stavanger	Norway	2020/01/07	Open-side, aboveground, exposed steel, freestanding	300
Private (ul. Górczewska 181)	Warsaw (**)	Poland	2020/10/20	Underground, reinforced concrete, below residential building (building demolished including residential building above)	22
SFO Airport	San Francisco	USA	2021/06/09	Open-side, aboveground, concrete, freestanding	8
Epsom Ashley Centre	Surrey	UK	2021/06/03	Open-side, aboveground, concrete, attached to shopping mall	7

Not all car park fires to date have resulted in total losses, however, the business interruption and alternative accommodation impacts following a significant, yet repairable, loss can be massive…

Emerging Risks & Challenges…

ZURICH

1.) Increased Sources of Ignition | EV Chargers
- EV chargers are high voltage electrical appliances that are subject to mechanical failure and are a potential source of ignition
- The more charging points the increased risk of failure

2.) Type of fire | Thermal Runaway
- Lithium-ion batteries used in EV Vehicles (fully electric, hybrids, E-bikes, E-scooters) have higher energy density to extend lifetimes
- These batteries are subject to mechanical or thermal failure, plus electro-chemical abuse from overcharging the cell can initiate thermal runaway
- Thermal runaway is caused by initially high temperatures (a fire) that leads to the rapid decomposition of the battery materials
- The higher the temperature, the more rapid the battery materials decompose, thus the fire increases in ferocity – it's a self-feeding process

3.) Increased Fire Loads | Plastics
- Modern Vehicles constructed of 70% expandable plastics; thus modern car parks literally have tonnes of highly-combustible plastics stored together
- The higher the fire load, the more rapidly a fire can spread, the higher the temperature may be and the longer it will burn for

4.) Car Park Design | Lack of Compartmentation
- Car parks are often horizontally large open floor spaces with open connections to other floors via ramps, staircases and elevator shafts
- Based on design and lack of compartmentation, most traditional car parks are one single fire area that support horizontal and vertical spread

5.) Car Park Protection | Sprinkler Protection
- Many car parks are not sprinkler protected, therefore, the only way to control a fire is through fire brigade engagement and manual fire fighting
- If thermal runaway and/or the fire is well developed, fire fighters are unlikely to fight the fire, especially in enclosed underground spaces

6.) Building Construction | Combustibility
- If the building adjacent or above to the car park utilises combustible materials in its construction, a well-developed car park fire could easily spread vertically to the façade via the walls or stairwells without sufficient car park compartmentation or sprinkler protection

Mitigation Measures

EV Charger Installation:

- Wall mounted units should not be installed within 10 metres of walls made of combustible materials or curtain glazing, nor beneath unprotected openings
- Internal chargers should be installed as close as possible to fire exits to provide easy access for fire brigade, toxic gasses a particular problem

Car Park Compartmentation:

- Internal chargers/EV parking should be in a separate fire compartment with at least 60 mins fire resistance / 120 minutes if underground
- Structural columns and plant rooms should be compartmented where possible to protect structural integrity of assets above plus ensure essential services can continue to run

Sprinkler Protection:

- Sprinkler protection should be considered in all existing and new build car parks
- High hazard systems are considered necessary to manage a modern car park fire

Note – the Government are due to publish Approved Document S – Infrastructure for the Charging of Electric Vehicles:
Approved Document S: Infrastructure for the charging of electric vehicles (publishing.service.gov.uk)

For further guidance, please see Risk Insight: Electric Vehicle Charging (zurich.co.uk)

EVs & Buildings – Some Key "Take-Aways"

The presence of plastics and lithium-ion batteries in EVs (fire load), plus their respective chargers (ignition source) will only increase over the coming years

Automatic sprinkler protection guidance for car parks must evolve in-line with such trends to prevent the total loss of a given asset

The installation of EV chargers must be carefully considered and managed, mainly by effectively compartmenting such areas and ensuring charging points are 10m away from combustible walls or materials

Without adequate sprinkler protection or compartmentation, capacity and pricing for assets with underground or adjacent car parks may be challenged

Early engagement and consultation with the Insurer is crucial

We all need to be aware of the risks and work together to support customers in adequately protecting their assets

Wood Is Good, But.....

Background

- Resident enjoying the sun on their private balcony
- What happens next…
- Carelessly discarded cigarette
- Portable barbecue
- Patio gas heater
- Candle knocked over

The Seemingly Innocuous Threat

- Balcony contents
- Timber decking on all balconies
- Timber exterior cladding mounted on timber batons.

The Results...

- 12 month repair period
- Upheaval for residents
- Uninsured contents losses
- Reputational Damage
- £1.8 million of insured losses

A changing built environment…

Modern Methods of Construction

- Entire building system(s)
- Individual components
- Individual materials
- Off-site construction
- Modular build
- ‘Flat-pack’
- Lightweight construction
- Emerging methodology and materials

A changing built environment…

Contrast the benefits with the risks… and challenge

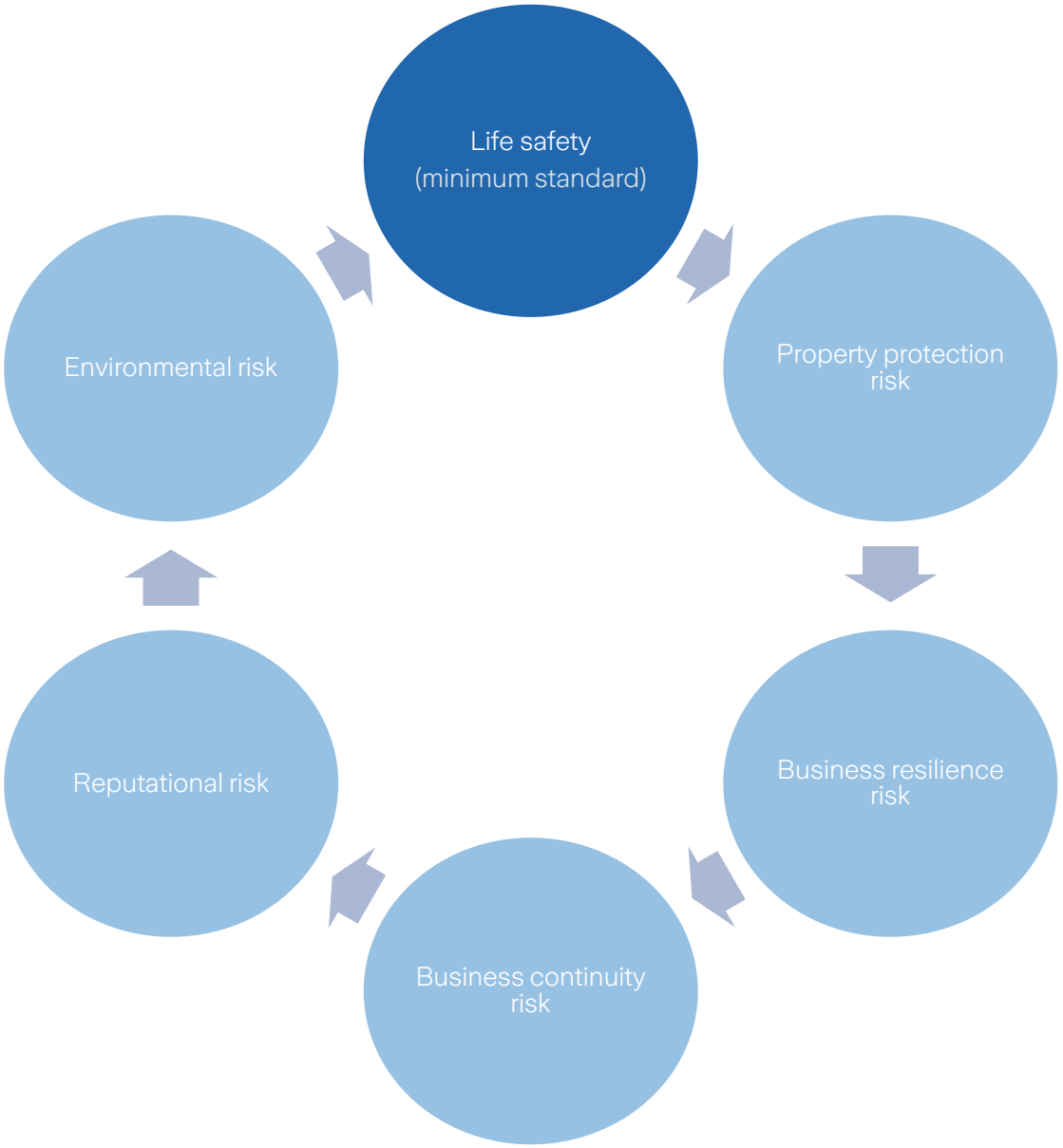
Common Benefits

- ✓ Opportunity to innovate
- ✓ Environmental considerations
- ✓ Sustainability targets & Energy performance
- ✓ Regeneration & refurbishment solutions
- ✓ End user benefits
- ✓ Reduced waste
- ✓ Skills & Labour shortages
- ✓ Speed of construction
- ✓ Reduced contract periods & cost predictability
- ✓ Consistency
- ✓ Quality of manufacture
- ✓ Cheaper? (economic crisis)

Key Considerations

- ✗ Emerging technologies
- ✗ Unproven innovation
- ✗ Reputational issues
- ✗ Untested/unproven materials
- ✗ Property resilience beyond regulatory compliance
- ✗ Fire fighting challenges
- ✗ Reinstatement / repair issues
- ✗ Life cycle issues & Ongoing monitoring and management
- ✗ Contractor / Trades awareness
- ✗ Quality of workmanship
- ✗ Cutting corners? (economic crisis)

Managing the risk profile



- Thinking beyond the minimum standard
- Appropriate property protection measures
- Consideration of potential consequences of a loss
- Overall resilience of the building, and similar premises
- Risk profiles differ from premise to premise
- Does a certificate = a sustainable and safe building?

A changing built environment..

01

Innovation in design & construction

02

Building structure

Products & materials

03

Changing skills sets

Skills gaps

04

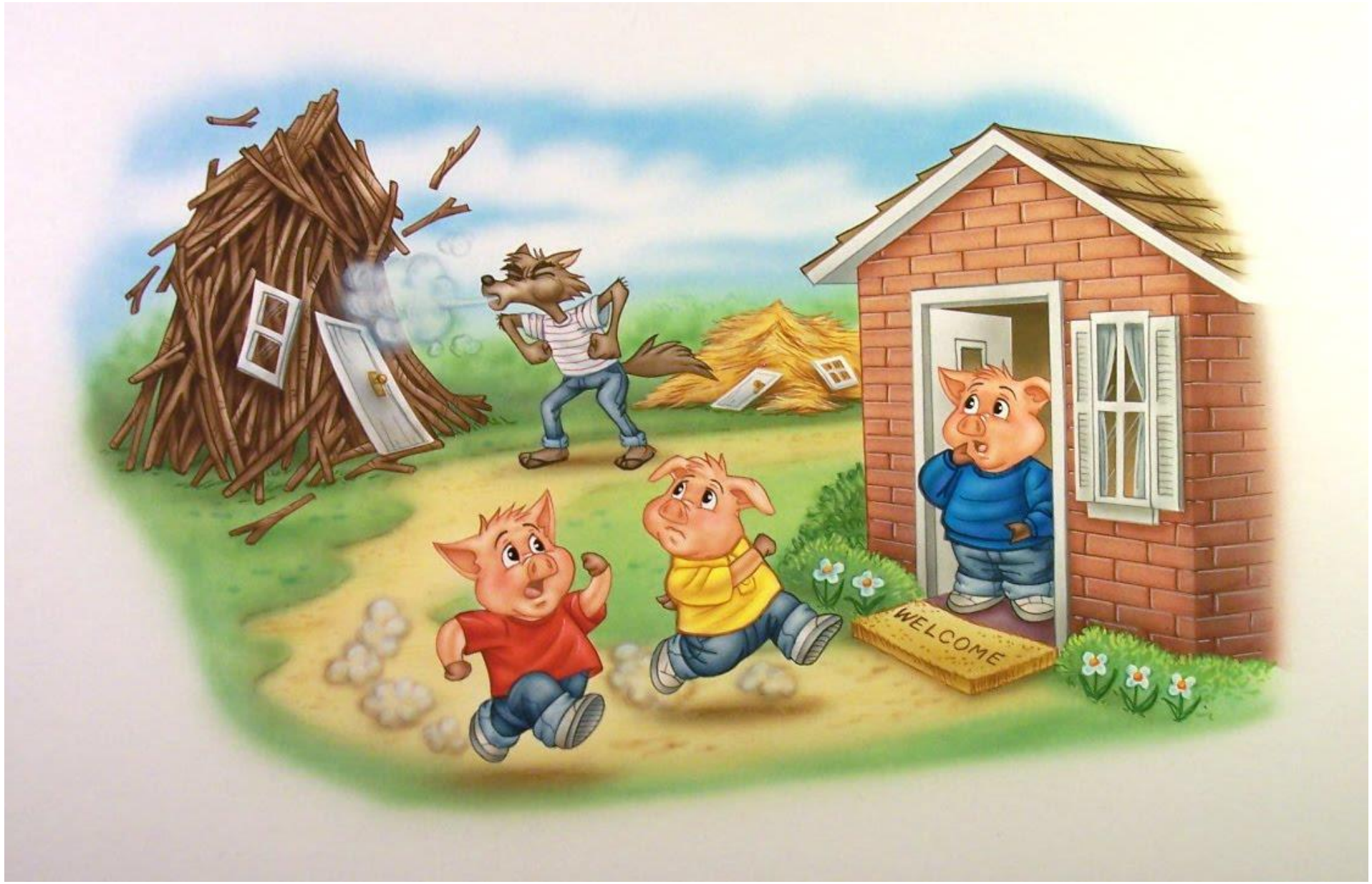
Occupancy Profile

05

Fire Fighting Approach

06

Accountability



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Thank you. Any questions?