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CIBSE School Design Group

Climate Change Adaptation - Work in Progress

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Presentation to London Heath Risk Group
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A hot topic for schools?



Image source: <https://www.tes.com/news/meet-uk-pupils-striking-against-climate-change>



Overheating Risks in Schools

- Young children are more vulnerable to the risks of heatwaves
- Teaching spaces typically have high occupancy densities, which can contribute to the risk of overheating
- Teachers and pupils may have different perceptions of the thermal environment
- Increasing ventilation rates is a strategy often employed in schools as a passive means of controlling internal temperatures
 - Young children are more vulnerable to the adverse health impacts of air pollution, which is of particular concern in London
 - Noise pollution can also distract from teaching activities
- Outdoor thermal comfort, including the provision of shaded areas within school grounds, is equally important for respite during hot weather



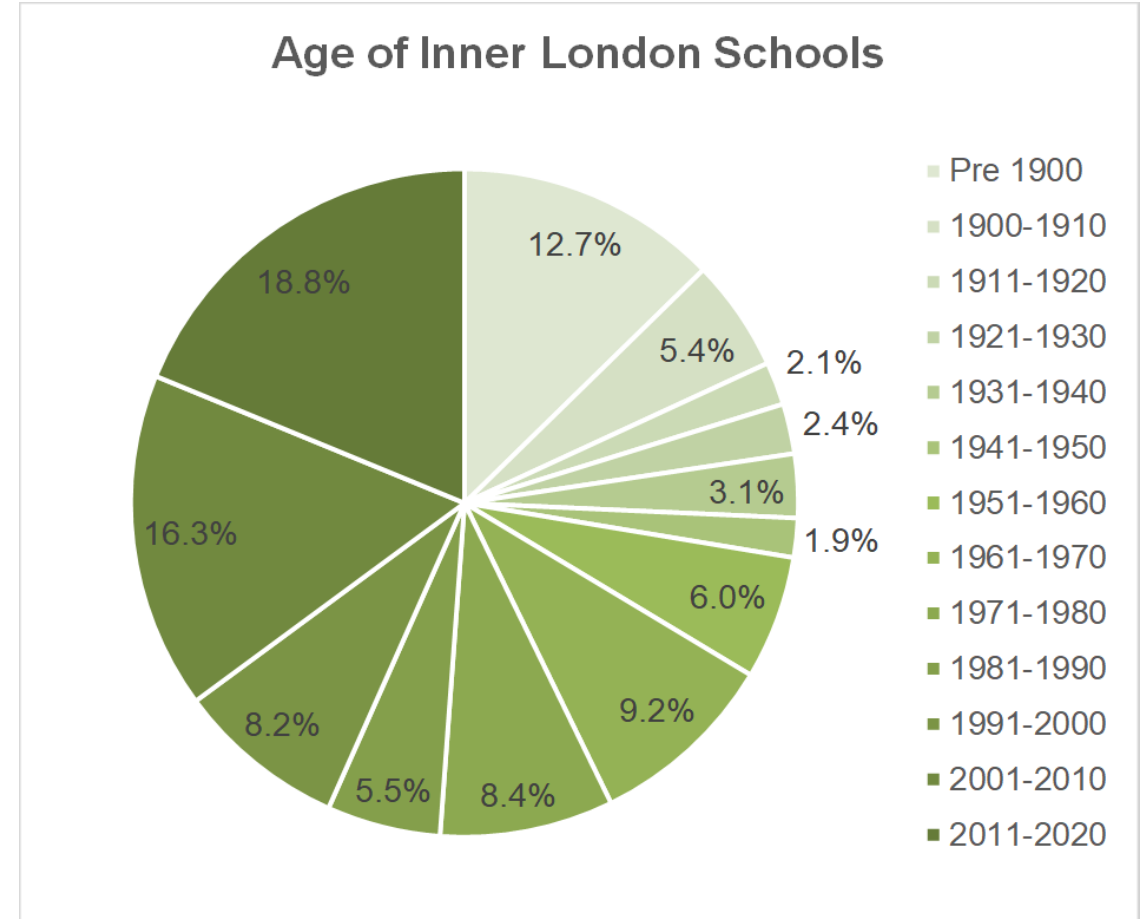
Existing Schools in London

2,687 school blocks within London (i.e. with “inner London” postcodes)

Over a third of the London school building stock has been constructed in the last 20 years

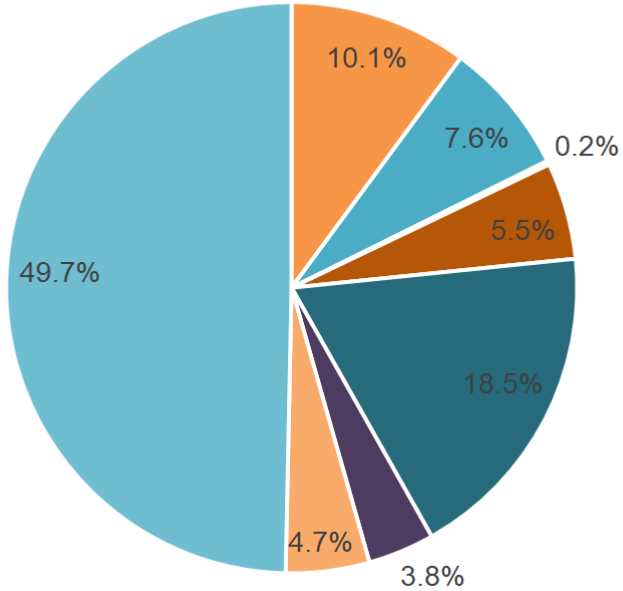
Approximately 50% of blocks are of traditional masonry construction

Increasing proportion of timber-frame, steel-frame and modular construction typologies in more recent schools (post-2011)

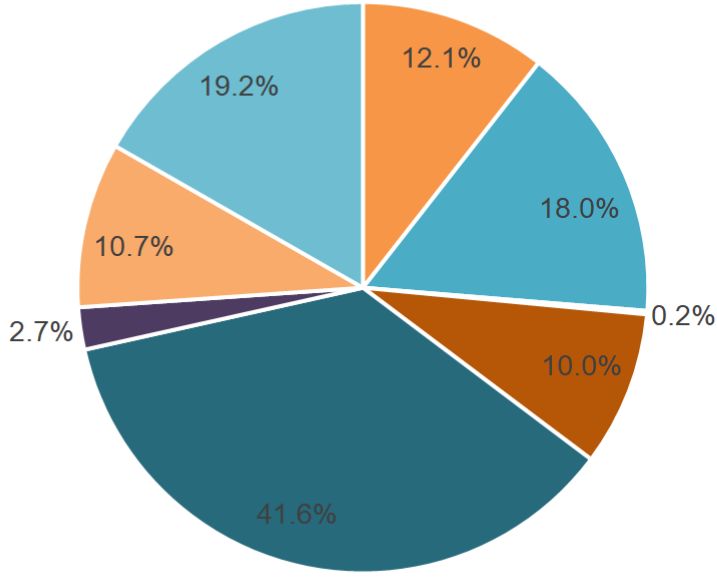


Existing Schools in London

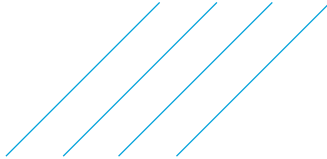
Construction of Inner London Schools (all)



Construction of Inner London Schools (post-2011)



- Concrete Frame (pre-cast / in-situ)
- Modular
- Other
- Relocatable Mobile
- Steel Frame
- System Build
- Timber Frame
- Traditional (load bearing masonry)



Design Standards for New Schools

- Building Bulletin 101 (BB101)
- DfE Output Specification (OS)
- London Plan
- Industry moving towards off-site, manufacturing approach to construction
- BB101 includes criteria for assessing overheating at the design stage and in-use
- Building Performance Evaluation is a requirement of the OS (6 months and 12 months after handover)

Building Bulletin 101
**Guidelines on ventilation,
thermal comfort and
indoor air quality in
schools**

Version 1

August 2018

For technical professionals involved in the design, specification and construction of new school buildings and the refurbishment of existing buildings



Key Questions

- How resilient are new schools designed to current standards to the predicted longer-term changes in UK climate?
- How well do current methodologies predict the risk of overheating?
- Which parts of the existing school building stock are most at risk from higher summer temperatures?
- How well are existing schools currently managing during heatwave events?
- What are the most cost-effective approaches for adaptation in schools?



Climate Change Adaptation Working Group

Group aim and objectives

The CIBSE School Design Group (SDG) has convened a climate change adaptation working group to share knowledge and promote good practice in adapting school buildings to future climate. The work of the group aims to engage industry-wide stakeholders to develop a balanced and collaborative range of recommendations.

In the first phase of work, the group aims to review the latest understanding of the changes predicted to occur in the UK climate this century, with a focus on the impacts of higher summer temperatures. The predicted impacts are to be examined with reference to the results of:

- Thermal modelling of new and existing schools (referred to as the “modelling” workstream);
- Feedback obtained from building performance evaluation studies of in-service performance (referred to as the “monitoring” workstream).

The group aims to report back on its interim findings in November 2019. This work will support the Department for Education in its response to the National Adaptation Programme for the UK Government.



Kick-off Workshop (April 2019)

Workshop 1 - Monitoring | Initial Ideas

Why is climate change adaptation in school buildings important to me and/or the organisation I represent?

What do I need or want to know about climate change adaptation in school buildings that I don't know?

Why?
- Better building performance
- Occupant health
- Reduced energy consumption to better quality and security costs
- Natural ventilation becomes a less viable option since adaptation occurs

What is the role of occupant health in the indoor environment?
- Add to DfE changes to operational hours, control of air, noise, lighting, etc.
- How can we do this in schools?
- What is the role of occupant health in the indoor environment?

What is for the best solutions?

What are they doing in Scotland Europe?

How will compliance be assessed?
- If it's not robust, others will ignore it.

How do we deal with existing stock?
- Simple measures
- Can we reduce our carbon footprint?
- How quickly will it become a big problem - not solved?

Will climate change make it worse?
- Can we reduce our carbon footprint?
- How quickly will it become a big problem - not solved?

Expectations of the end user:
- What do they expect to be able to do?
- How do we deliver on that?
- How do we deliver on that?
- How do we deliver on that?

Engaging the future health of our children
- How do we engage with the future?
- How do we engage with the future?
- How do we engage with the future?

Climate Change Adaptation in Buildings

What do we need to know about climate change adaptation in school buildings that I don't know?

What is the role of occupant health in the indoor environment?

What is for the best solutions?

What are they doing in Scotland Europe?

How will compliance be assessed?

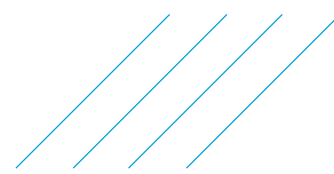
How do we deal with existing stock?

Will climate change make it worse?

Expectations of the end user:

Engaging the future health of our children

Climate Change Adaptation in Buildings



Key Points from the Workshop

- **The industry needs to do more to understand how schools are currently performing** in order to predict their performance under future climate scenarios.
- There are **a range of barriers to wider practice of building performance evaluation**. The working group aims to share experience of making it work in practice, including **effective engagement with building users**.
- The **existing school building stock represents the biggest challenge** for both climate change mitigation and adaptation. However, the working group is also an opportunity to reflect on the performance of schools designed to current standards.
- Dynamic thermal modelling is the basis of current design standards for schools. The group aims to provide further guidance on the selection of weather files and QA procedures to encourage consistency in modelling approaches. **Schools designed to recent standards are to be modelled to test their performance under longer-term climate change scenarios**.
- **The group aims to collate case studies of Building Performance Evaluation studies previously completed in schools**, including performance during the hot weather experienced in 2017 and 2018, and share lessons learned from the process.

Knowledge Share and Collaboration

London faces particular challenges in relation to climate change adaptation – do we need to design differently for the capital?

Contacts who might be able to support the activities of the CIBSE schools climate change adaptation working group? Both the modelling and monitoring workstreams and also higher-level policy implications.

Knowledge share with related research projects / interest groups?

