



# Off-site Construction—

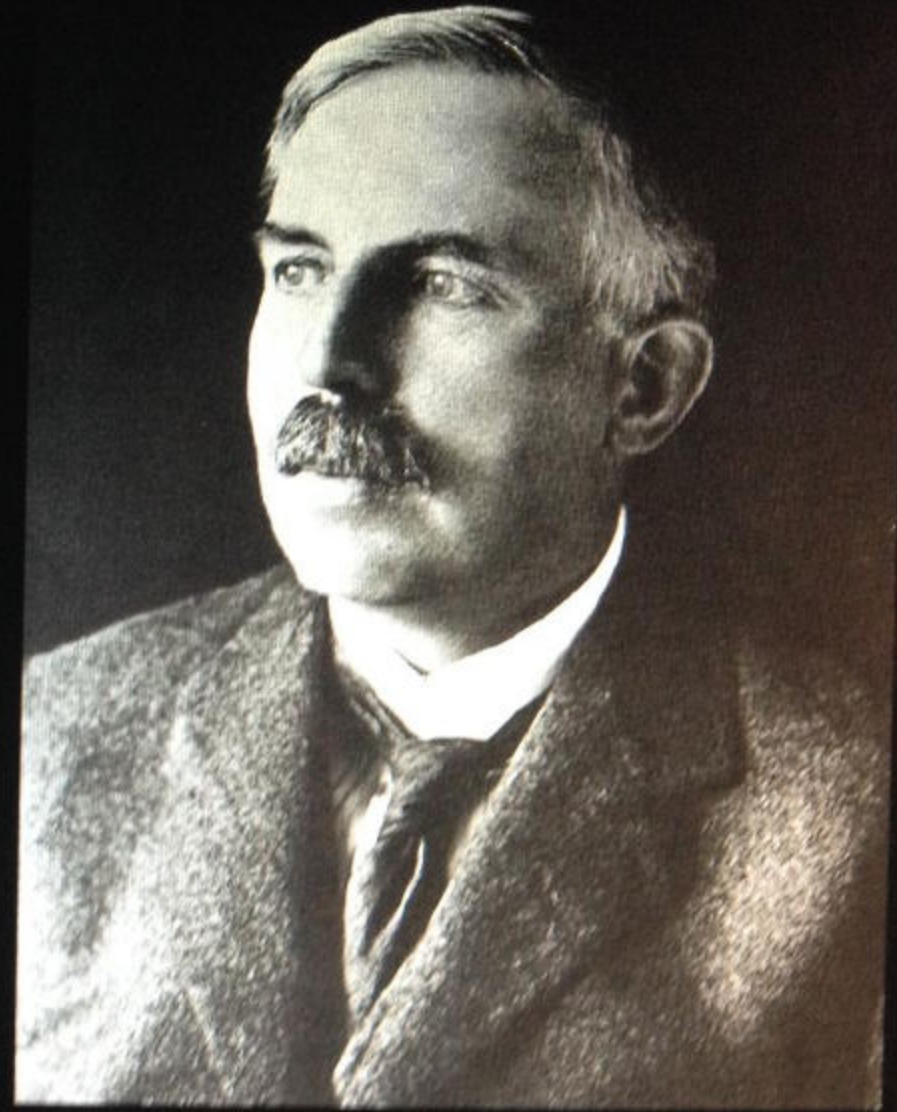
---to reduce  
cost and increase  
sustainability.

**David Adamson**  
University of Cambridge

23 Nov 2021.

*We haven't got  
the money,  
so we've got to  
think.*

**Ernest Rutherford  
(Baron Rutherford of  
Nelson)**



# Major shifts in UK.....Budget-driven tendering.

- UK has been switching from “this is what I want; what’s your best price to do that?”

to.....

“this is the amount of money I have for this project, and this is what I want to get; how much of what I want can you provide for that much money?”

# Major shifts in UK...**whole-life costing.**

**Not just capital cost but also whole-life costs – capital plus running costs for at least 10 years.**

# UK Key Performance Indicators: Athens 2015....

- **Design Quality**
  - **Construction Quality**
  - **Community relations**
  - **Social sustainability**
  - **Environmental.**
- 
- **Now in 2021....**

# Priorities in 2021...

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1. Total Cost, capital cost plus whole-life costs.

2. Quality/Sustainability: reduce CO2.....  
.....towards 'net zero carbon' (nzc).

3. Programme period –quicker, and lower risk programme.

4. Site conditions/safety/ local environment.

## Designer/constructor appointments

- Cost/quality balance.....

Agree and clearly promulgate in advance

**% balance between cost and quality—**

typically 30 cost/70 quality for designers,

60/40 to 80/20 for constructors.

I'VE MADE 120 DECISIONS TODAY,  
ALL OF THEM  
WRONG!





• .....SO.....

Shift from mainly **site industry** to.....

- ..... increasingly factory industry.

# Types of off-site construction.

- **Modular**—volumetric; whole sections of a building.

# Types of off-site construction.

- **Prefabricated components** such as walls, bathroom cubicles, staircases....

# Types of off-site construction.

- **Panels.**

# Types of off-site construction.

- **Mixed** -- modular and components.

... why off-site?

.... because....**Cost** and **waste** reduction.

- **cost reduction by reduction of waste, by closer quality control and by more re-cycling .....**

... why off-site? Because....some statistics...

- **...Reduced unit costs:** in some cases in UK, up to 84% (2019 survey) :
  - 
  - **....In UK, average on-site construction waste is 10% : in off-site construction waste is 1-3%. Overall project cost saving by waste reduction is 2.5 to 4%.**
- less cost by closer quality control and by more re-cycling.**



...and because....

- better quality control in the factory gets better sustainability standards; better than working up a ladder in the rain!

# ...Why off-site? Because....

- **Project time reduction.**
- **Project time reduction through off-site construction in UK is in the range 25 –60%: generally 25 –40%, but can be 50—60% for buildings with large repeat modules eg office accommodation, schools.**

....for example....

.... In Cambridge  
small housing  
units for homeless  
people on  
temporarily  
available sites.



New school in Cambridge: opens next month!



...and because....

- Site conditions such as less local traffic and **mud** on the roads, less **noise**, more control over working hours—so, less opposition to getting planning permission and less complaints on site.

...and because....

- **modern IT systems such UK Building Information Method (BIM) and Visual Recognition (VR) are even easier to use.**

'Never Give Up'.....







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