

Materials Matter

quality over quantity

Oliver J. Curtis



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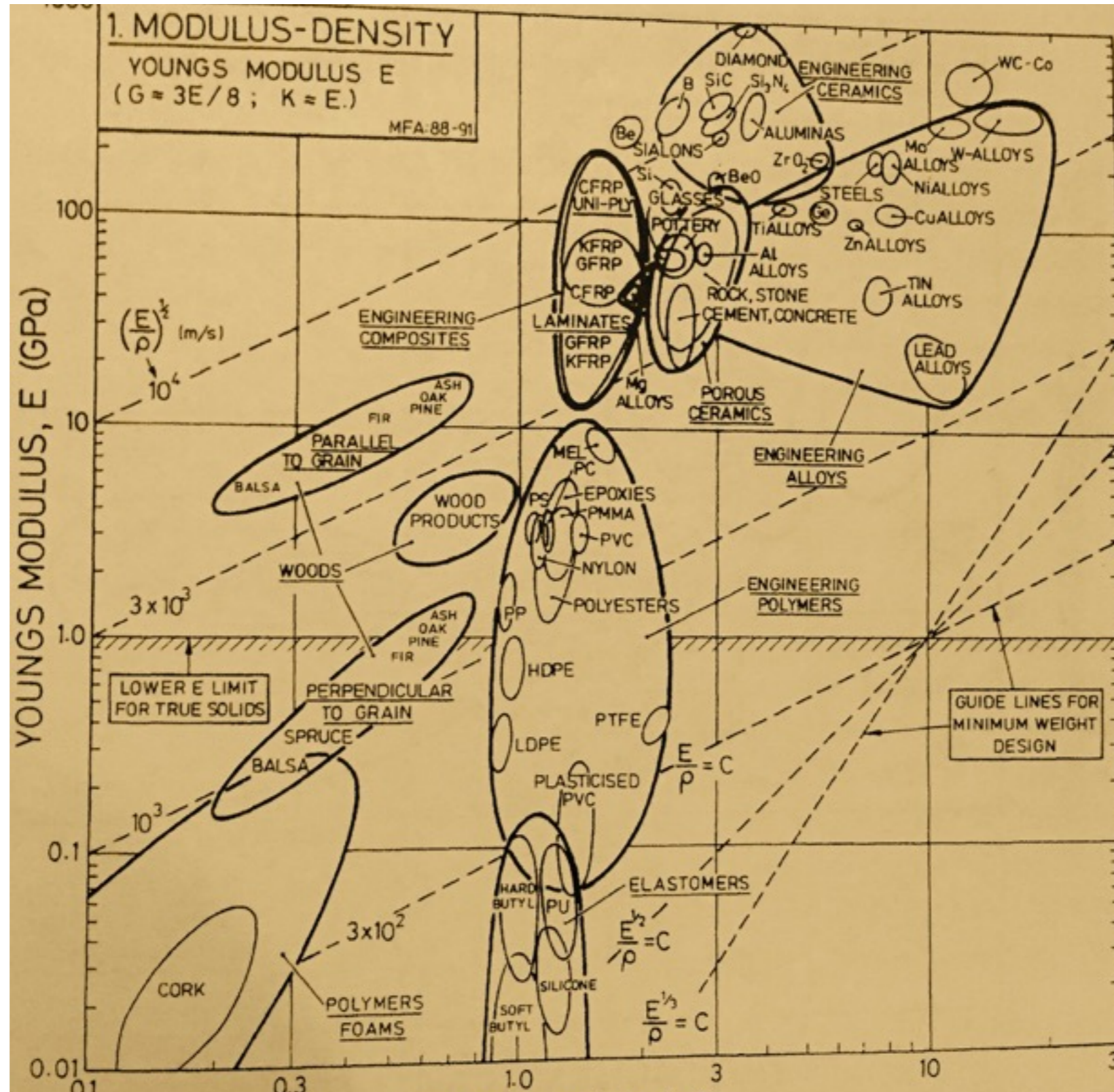
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“the vaster and richer your pool of creative resources, the more you are able to notice the chance when it happens, and seize it, and turn it into something productive, and something beautiful, and something meaningful.”

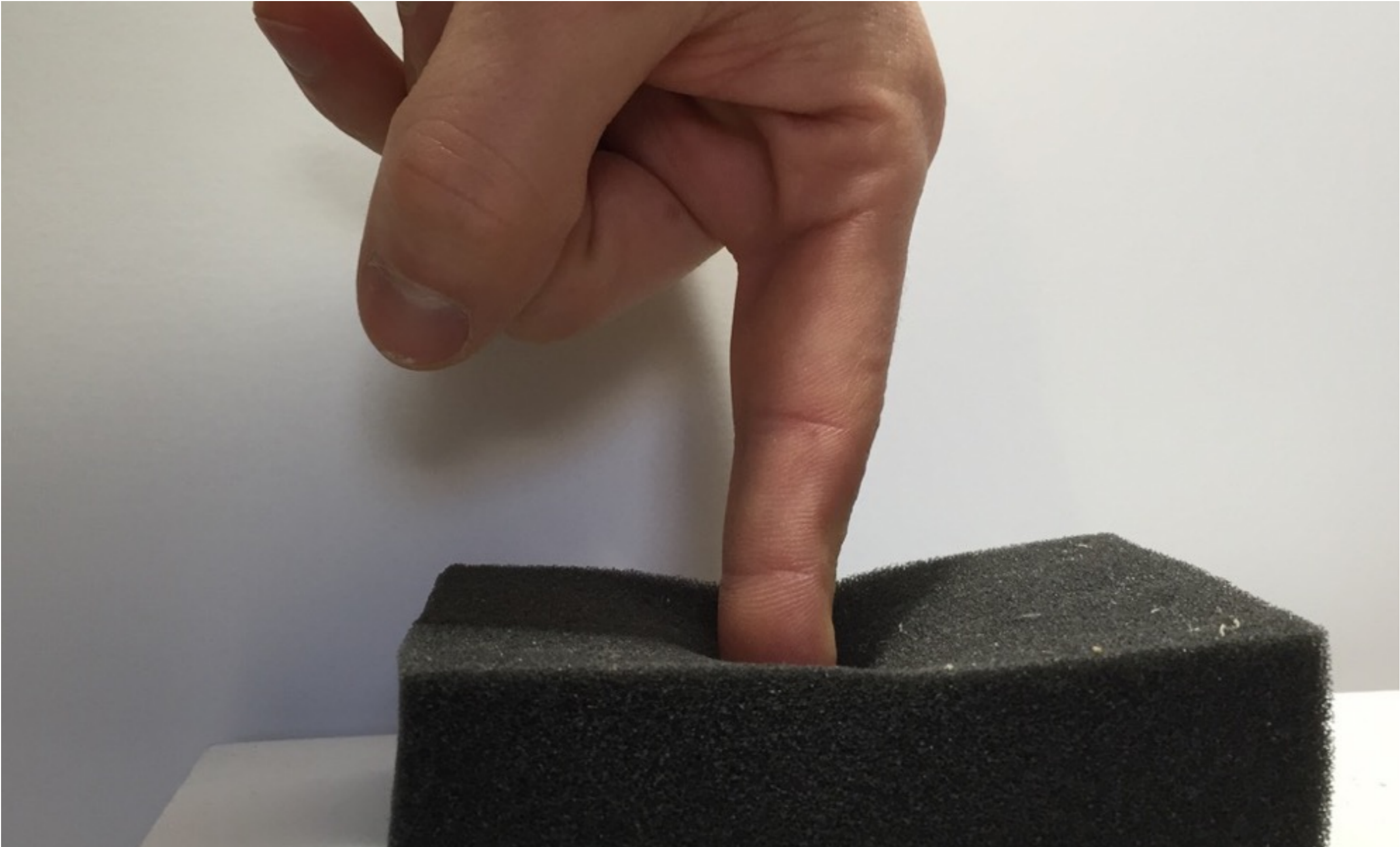
–Maria Popova

characterize building materials as cellular solids

understanding materials: size, shape and density
allows us to exploit their intrinsic properties



density

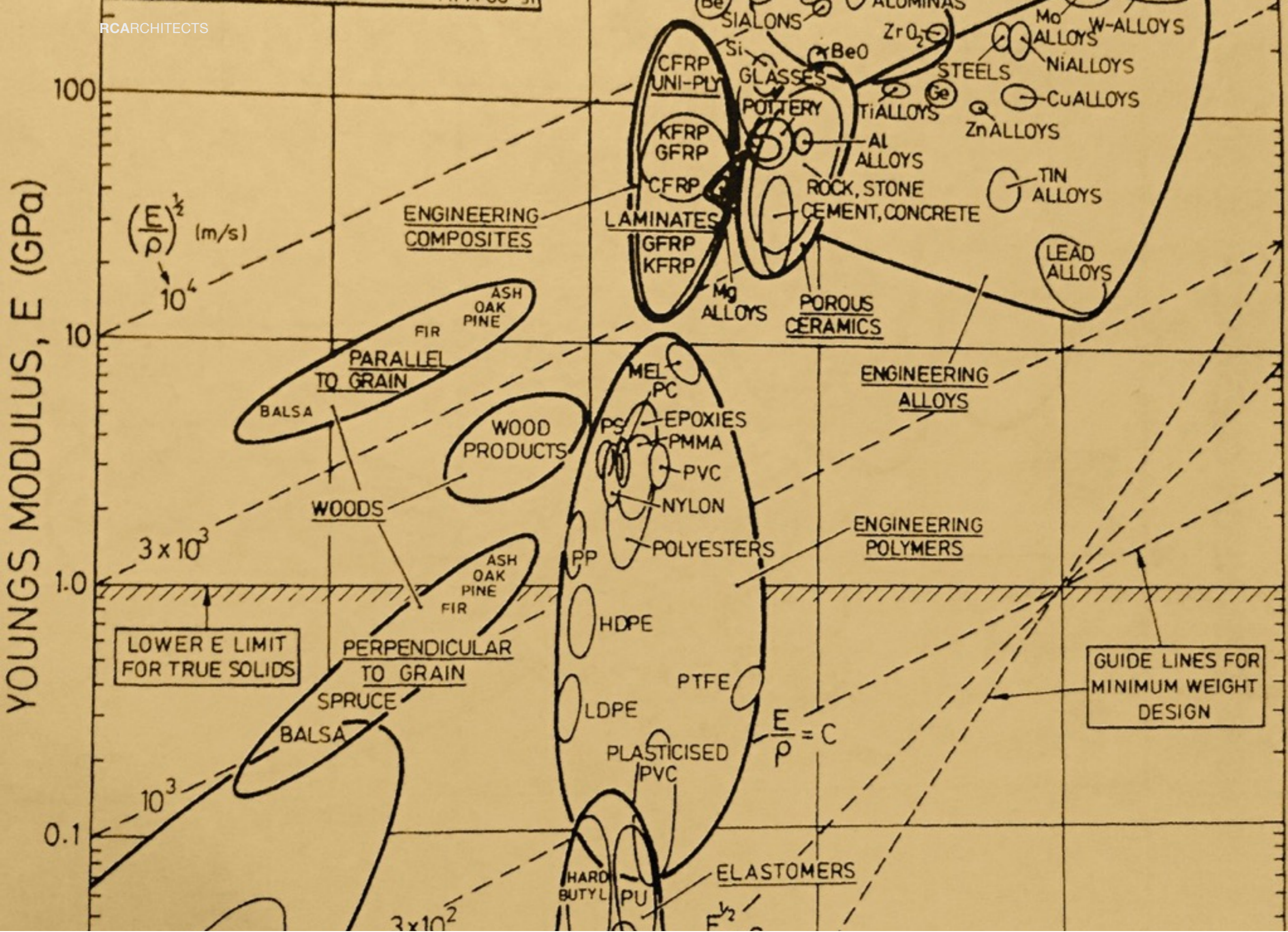


low rigidity

isotropic: the same in all orientations
an·isotropic: directionally dependent



wood studs



Lorna J. Gibson and Michael F. Ashby. "Cellular Solids: Structure and Properties" (1999).



urban infill in a highly regulated market

1 in 12 residents are...

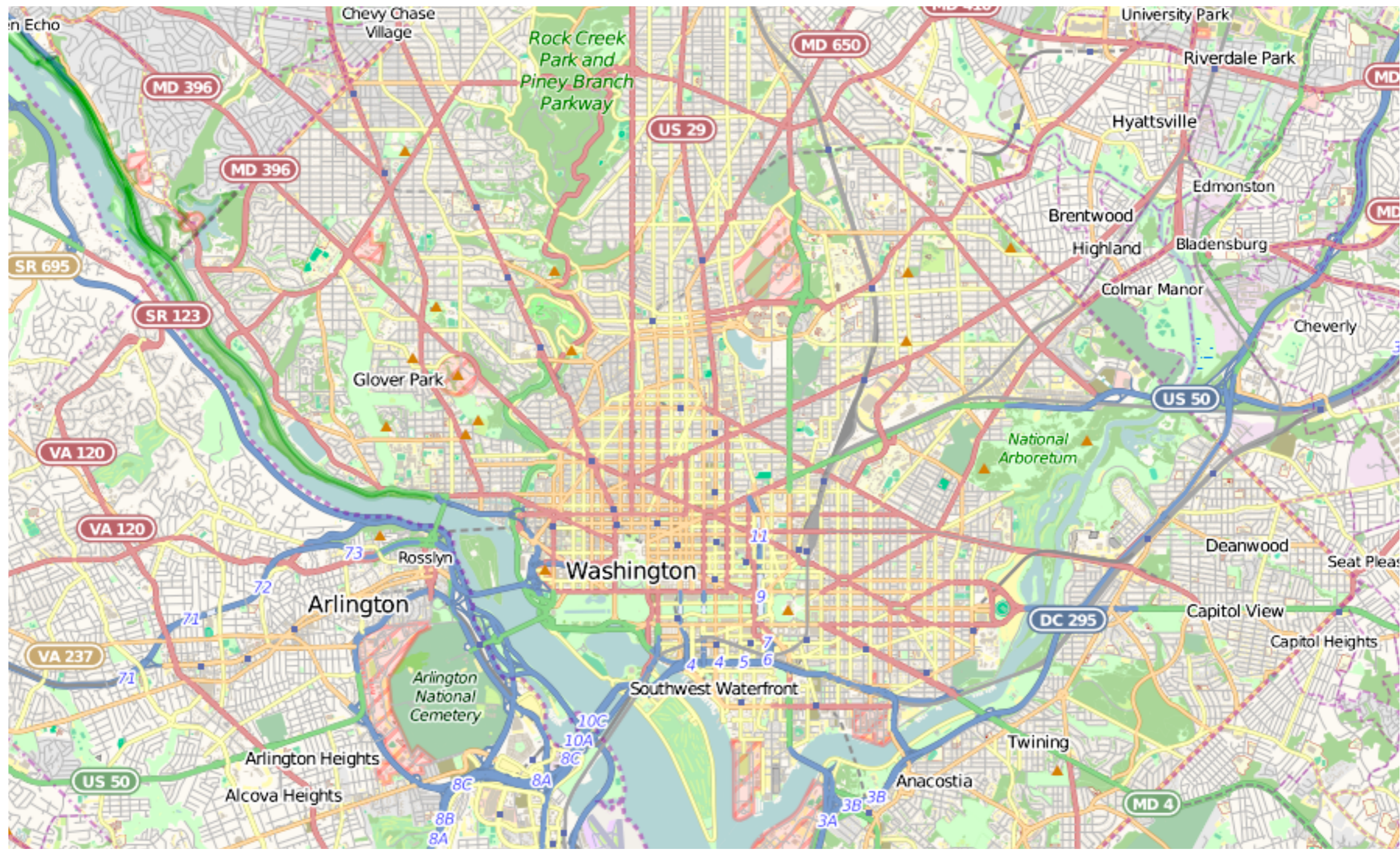
urban infill in a highly regulated market

**1 in 12 residents are...
lawyers**

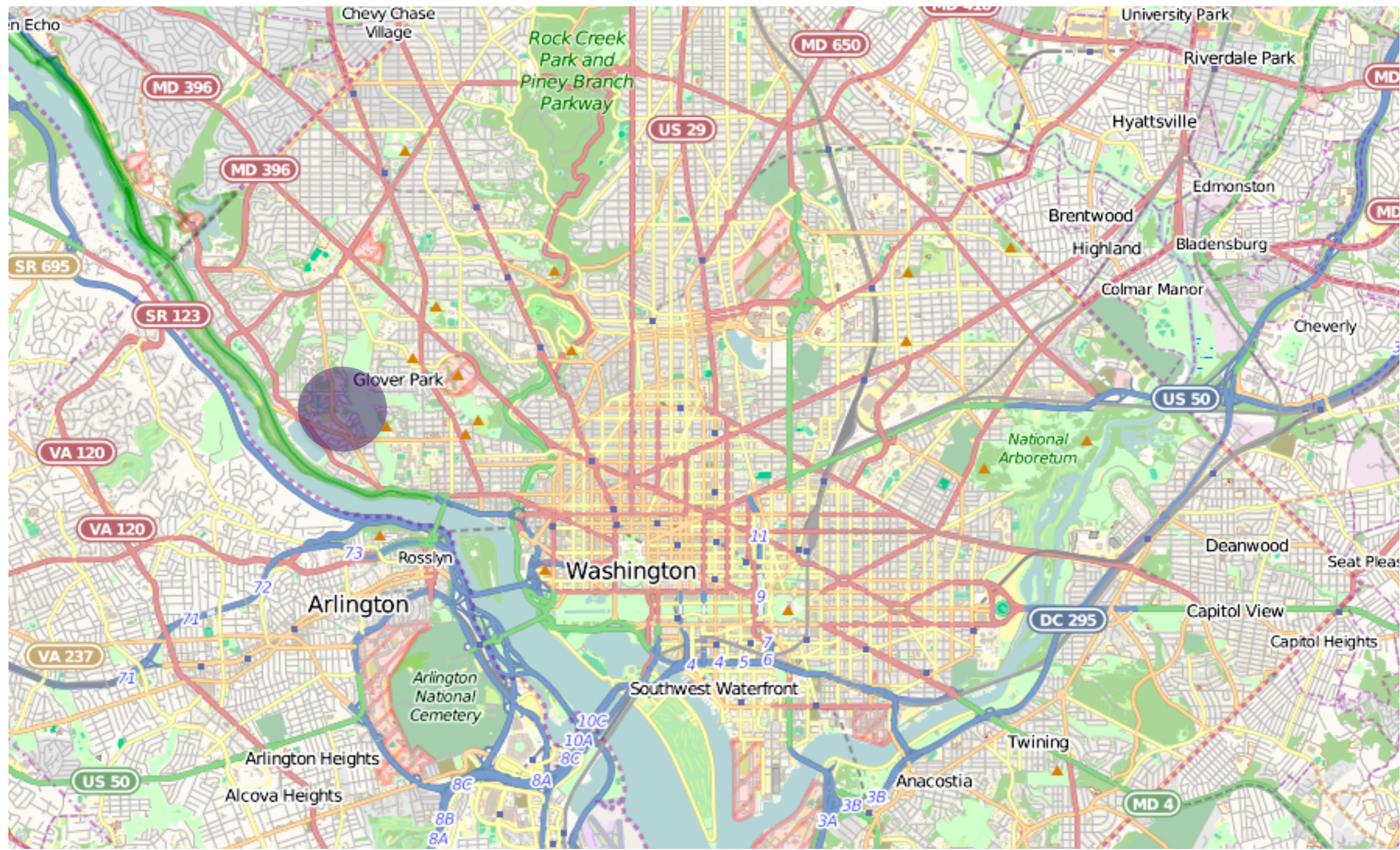
urban infill in a highly regulated market

**more than 22 times
the national average...**

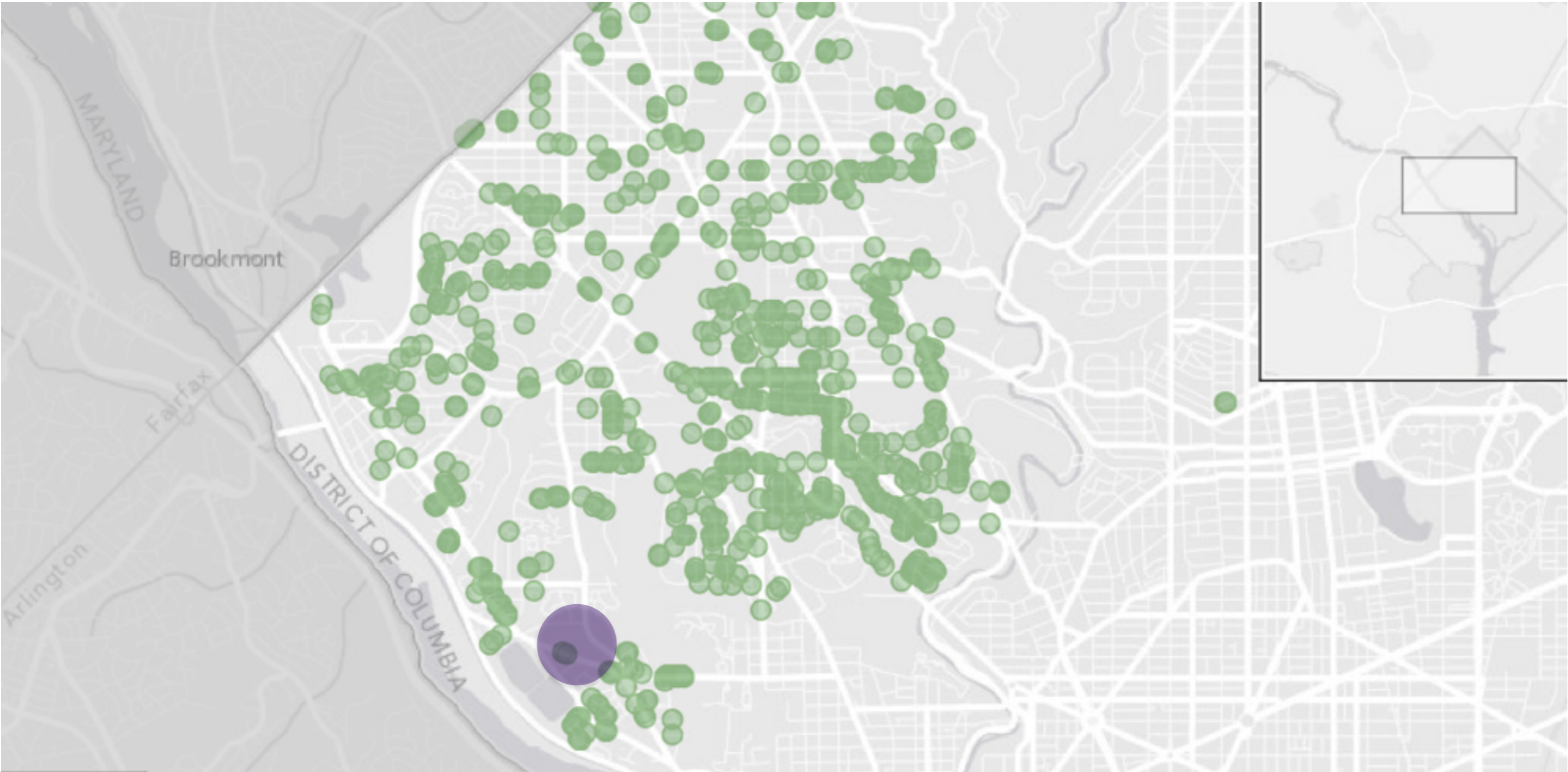
urban infill in a highly regulated market



openstreetmap.org



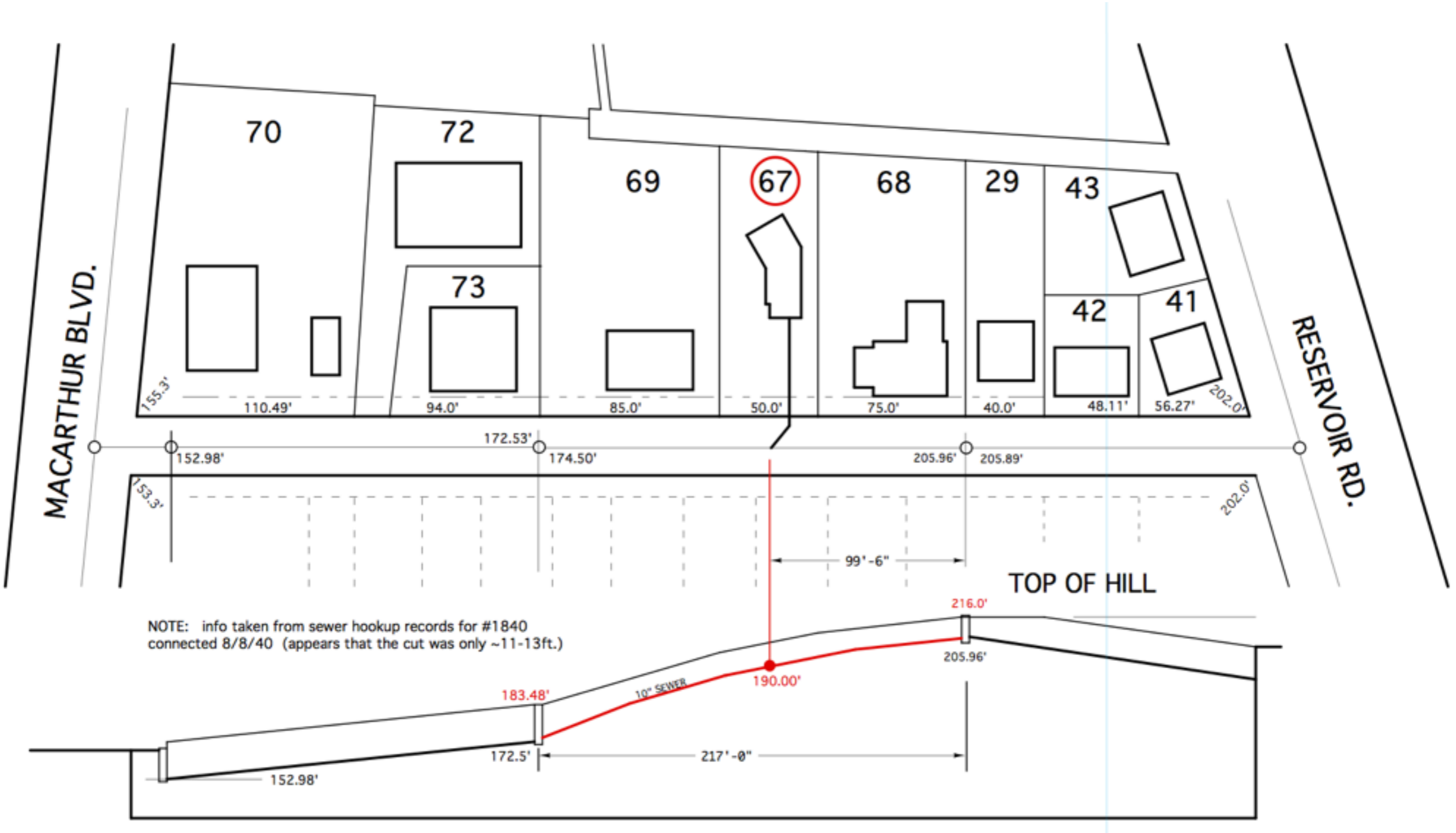
openstreetmap.org



scheduled neighborhood tree plantings - ESRI maps



Soil Survey - USDA Natural Resources Conservation Services



utility survey



site survey - Robert Curtis Architects

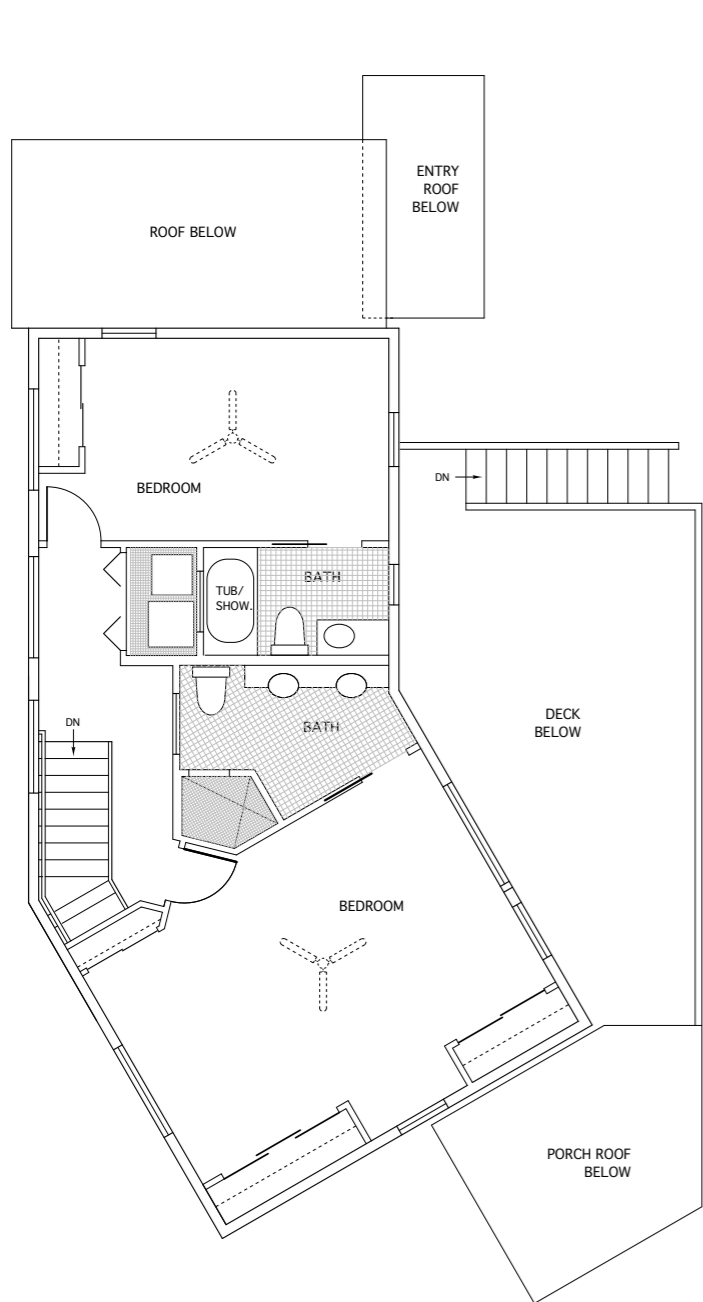


urban infill lot

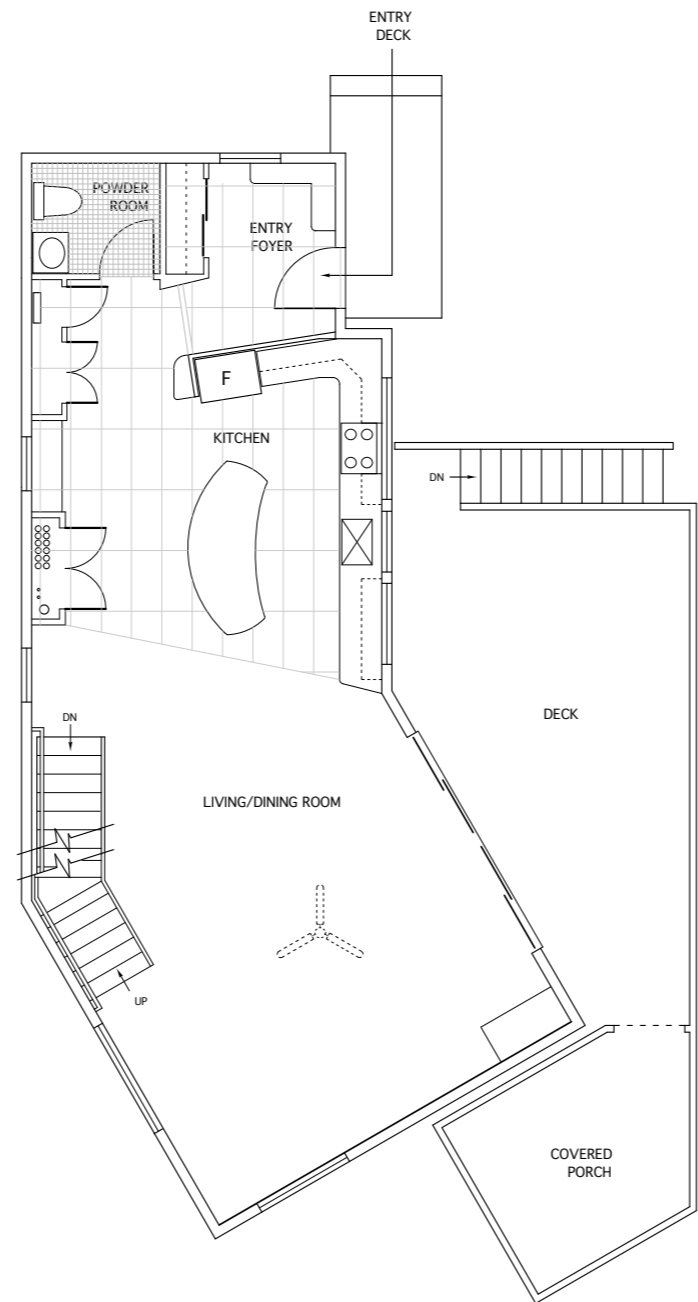




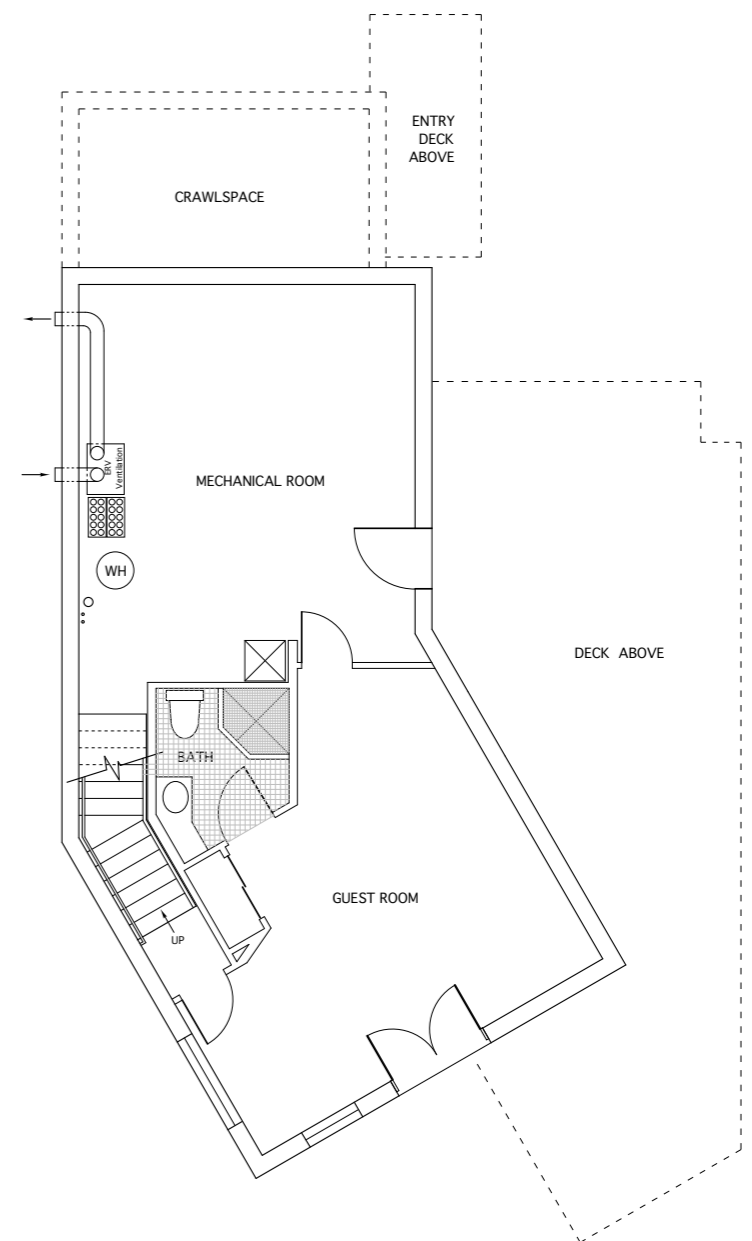
Robert, architect



3 UPPER LEVEL PLAN
SCALE: 1/4" = 1'-0"



2 MAIN LEVEL PLAN
SCALE: 1/4" = 1'-0"



1 LOWER LEVEL PLAN
SCALE: 1/4" = 1'-0"













1. accept transient conditions

2. avoid superficiality

3. embrace complexity

the behavior of the whole cannot be predicted by
the behavior of any parts taken separately

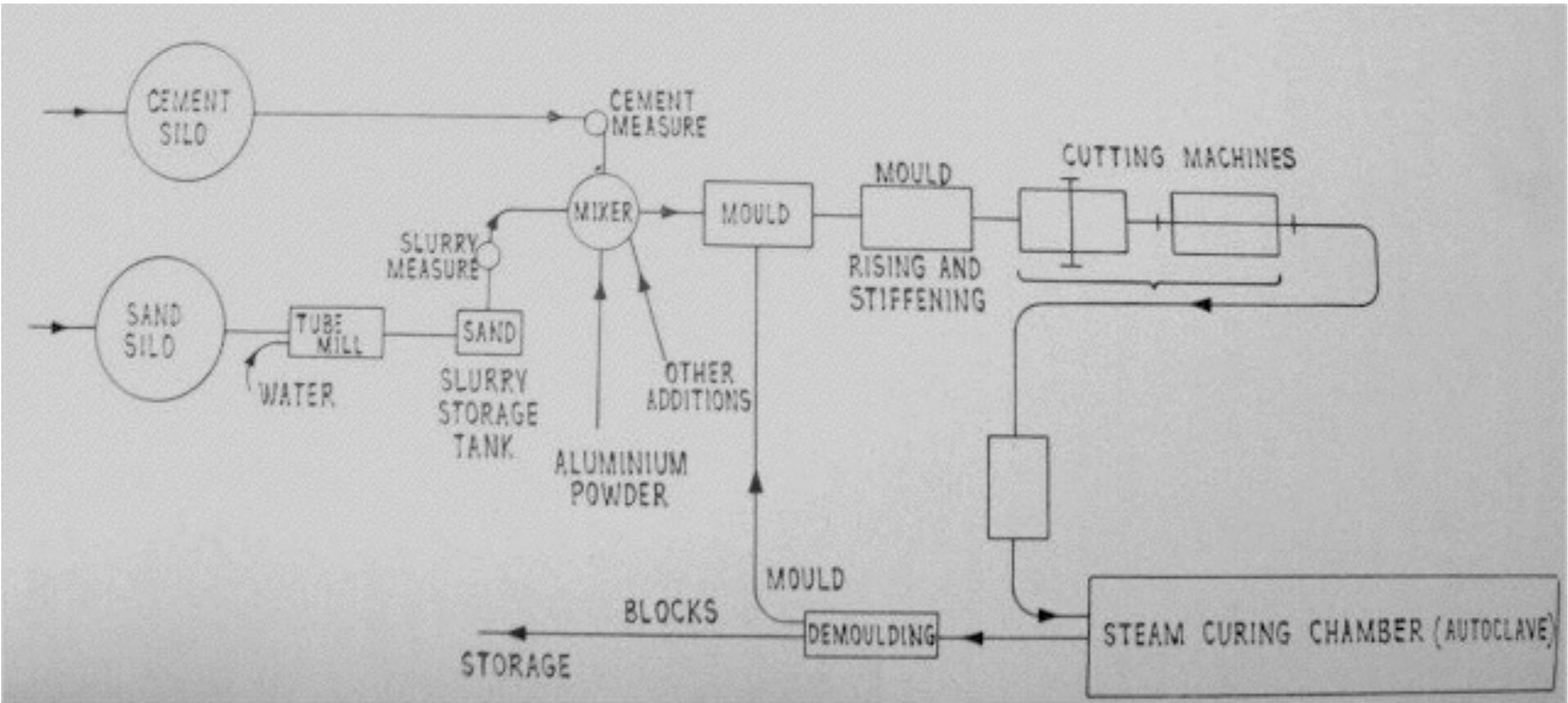
–R. Buckminster Fuller



structural insulated panel



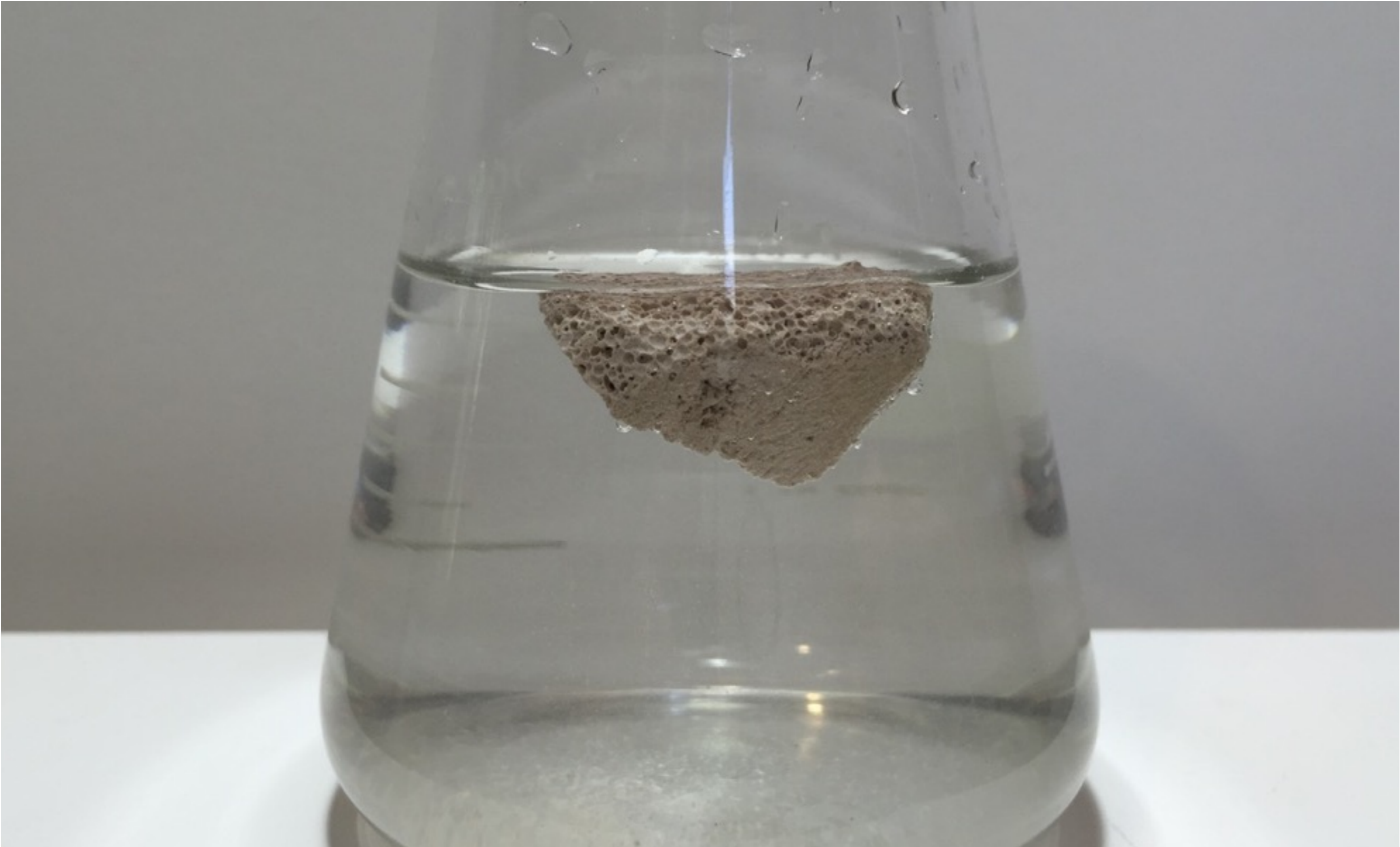
autoclaved aerated concrete



production process



surface of autoclaved aerated concrete



floating concrete





















dry stacked AAC block retaining wall

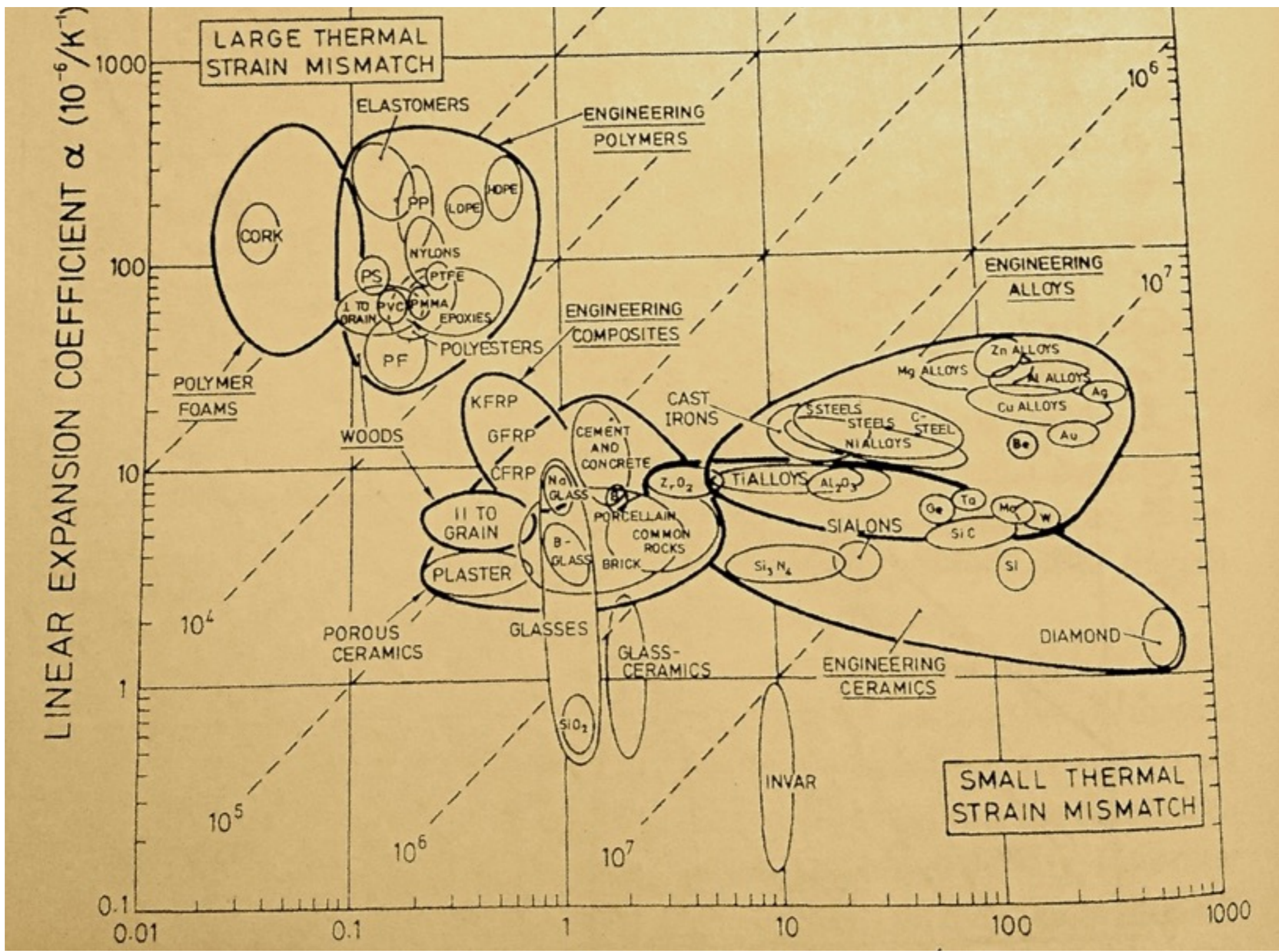


dry stacked AAC block retaining wall



drywall waste

scalable
versatility
dimensional stability
compatibility



thermal conductivity



surface of cellular glass

termites, liability and exterior insulation

SPECIAL HAZARDS

1. Do any of your operations involve the following?

Use of cranes?

Use of tower cranes.....

Length of booms: _____ (# of ft)

EIFS (Exterior Insulation and Finish Systems)?

Demolition of structures (other than interior)?

Structural alterations?

Blasting?.....

Foundation Repair?

Shoring or underpinning?

Pile driving?

Caisson or cofferdam work?

Other Special Hazards: _____

Explain all "Yes" responses: _____

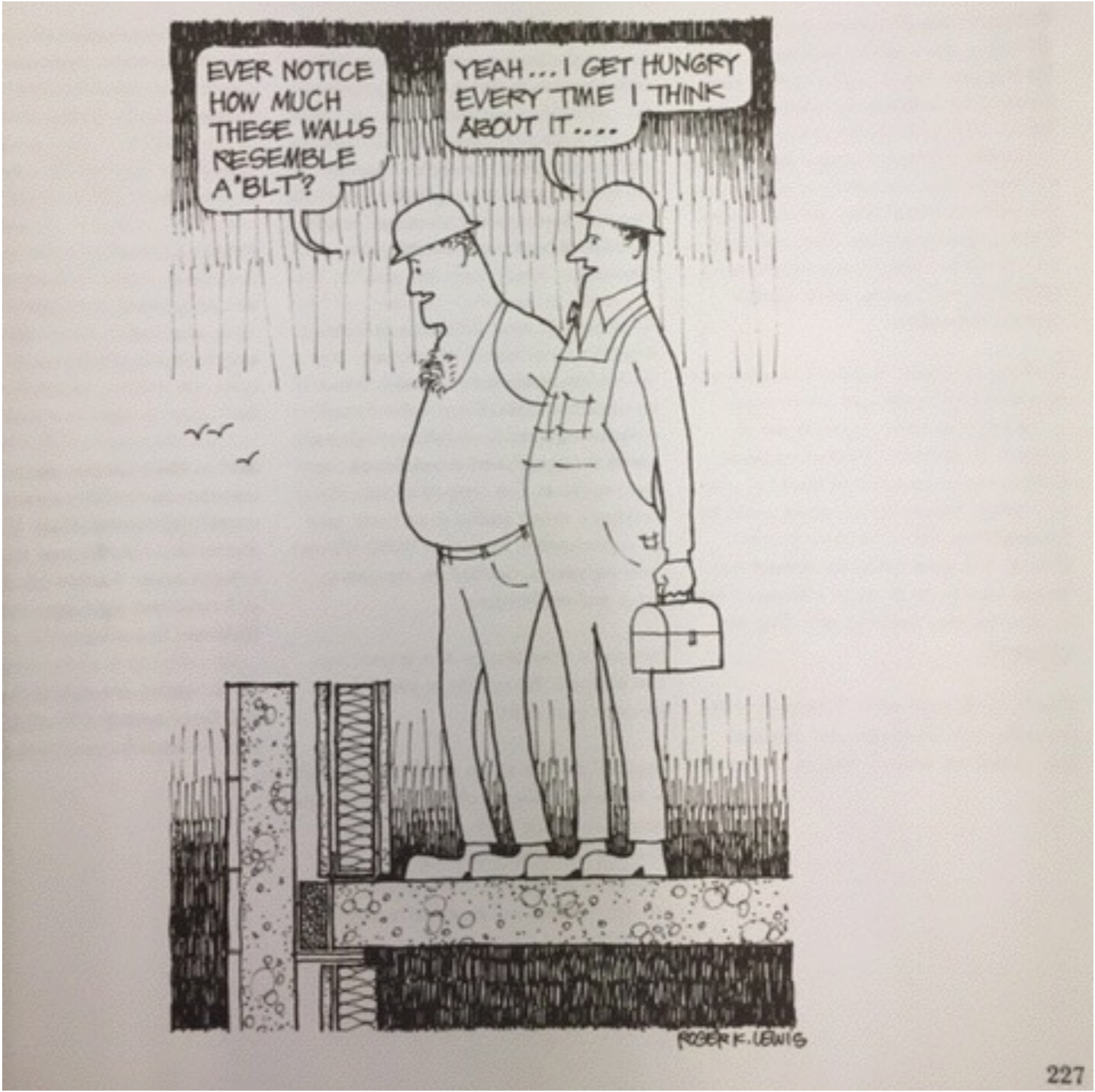
Special Hazard:



autoclaved aerated concrete block

and

cellular glass block



Roger Lewis. *Shaping the City*



foundation exterior

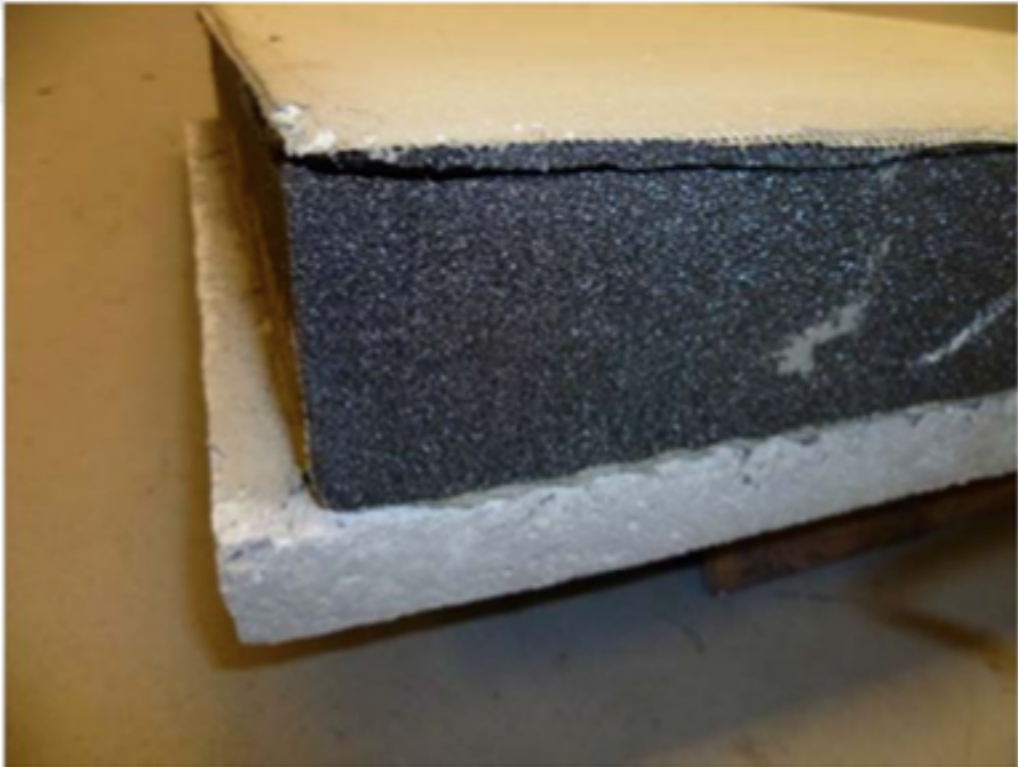
seeking compatibility



autoclaved aerated concrete block

and

cellular glass block



shear failure after thermal cycling

courtesy of Pittsburgh Corning internal document



natural hydraulic lime



applying lime stucco



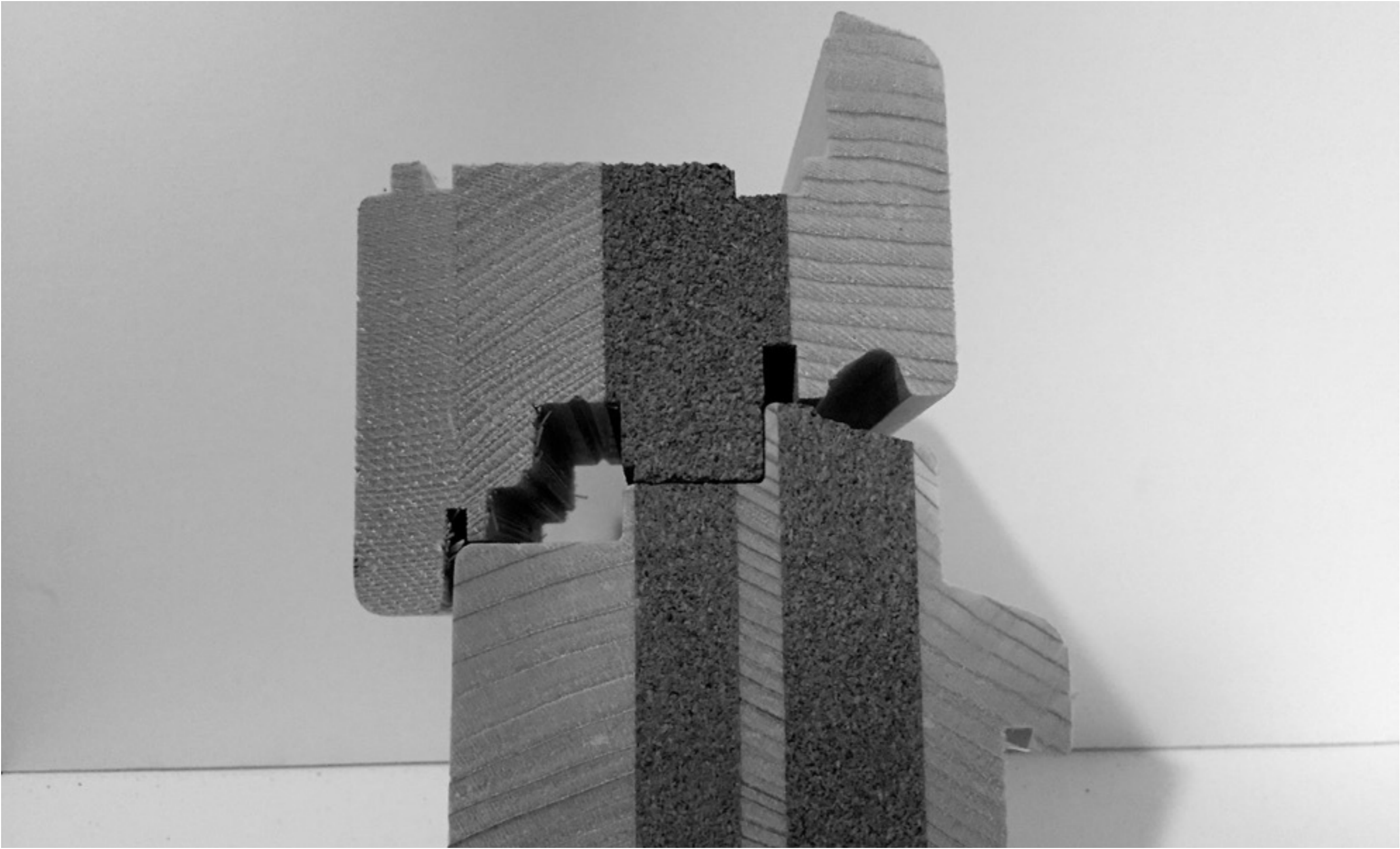
wood



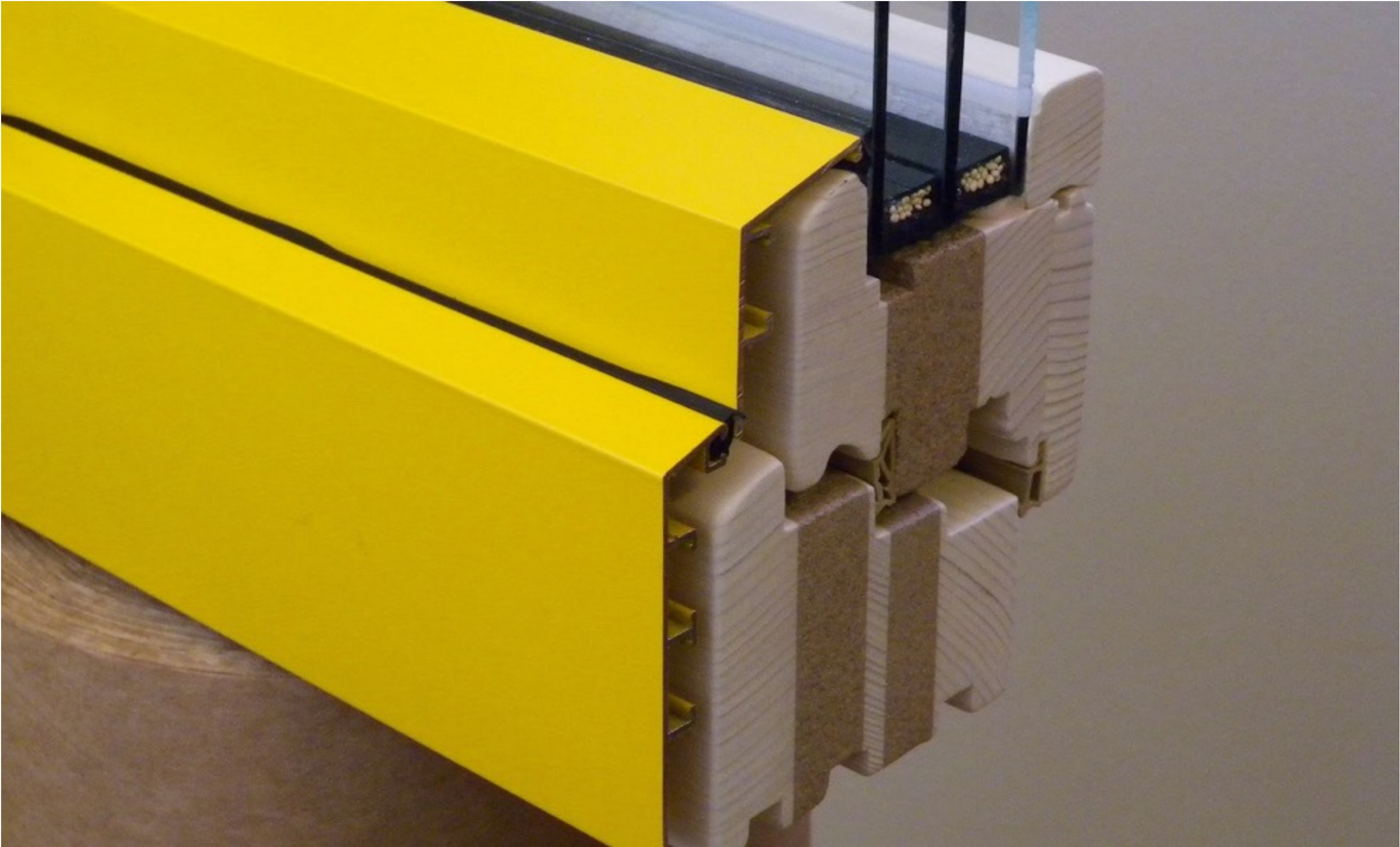
cork



cork

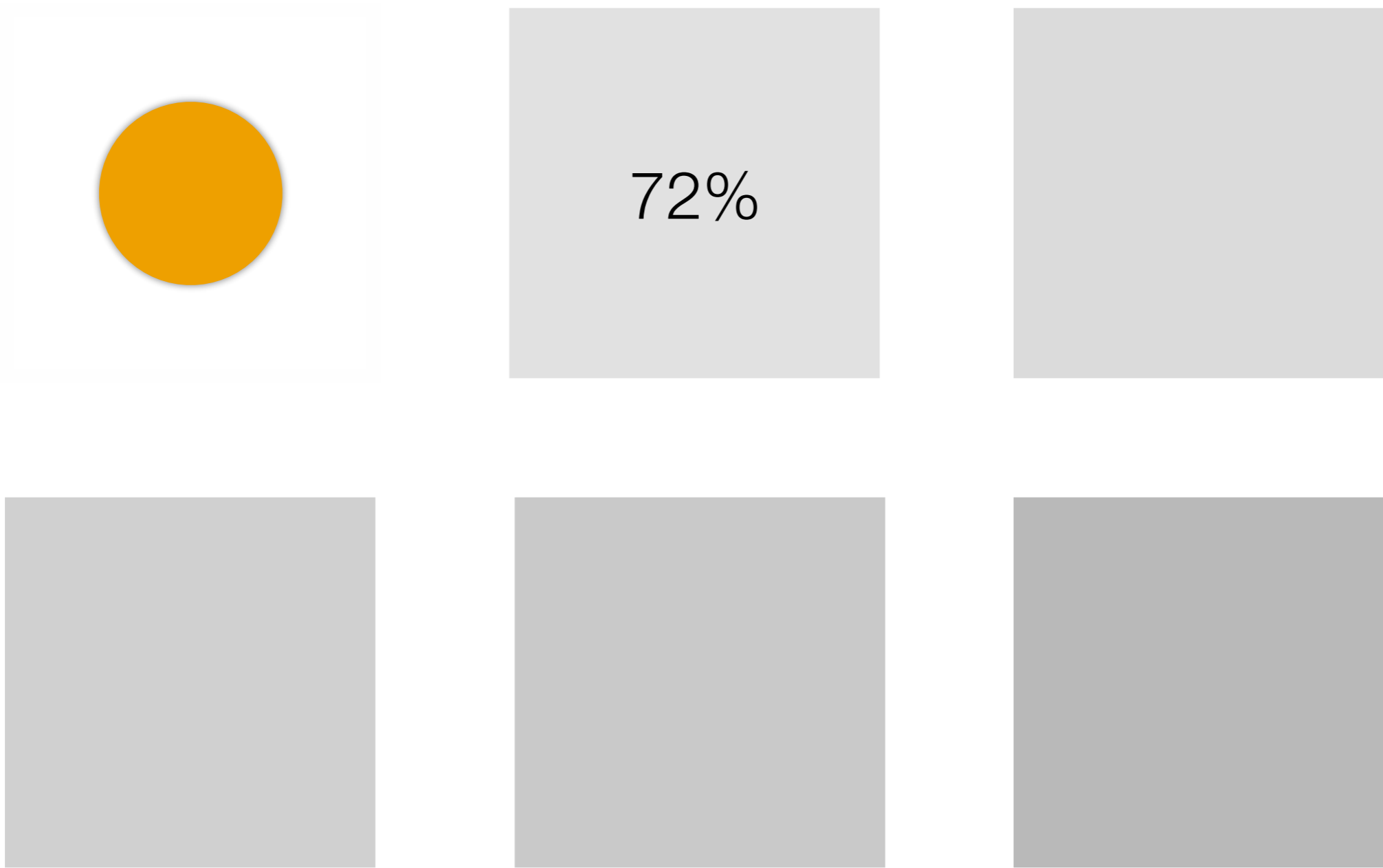


window frame section

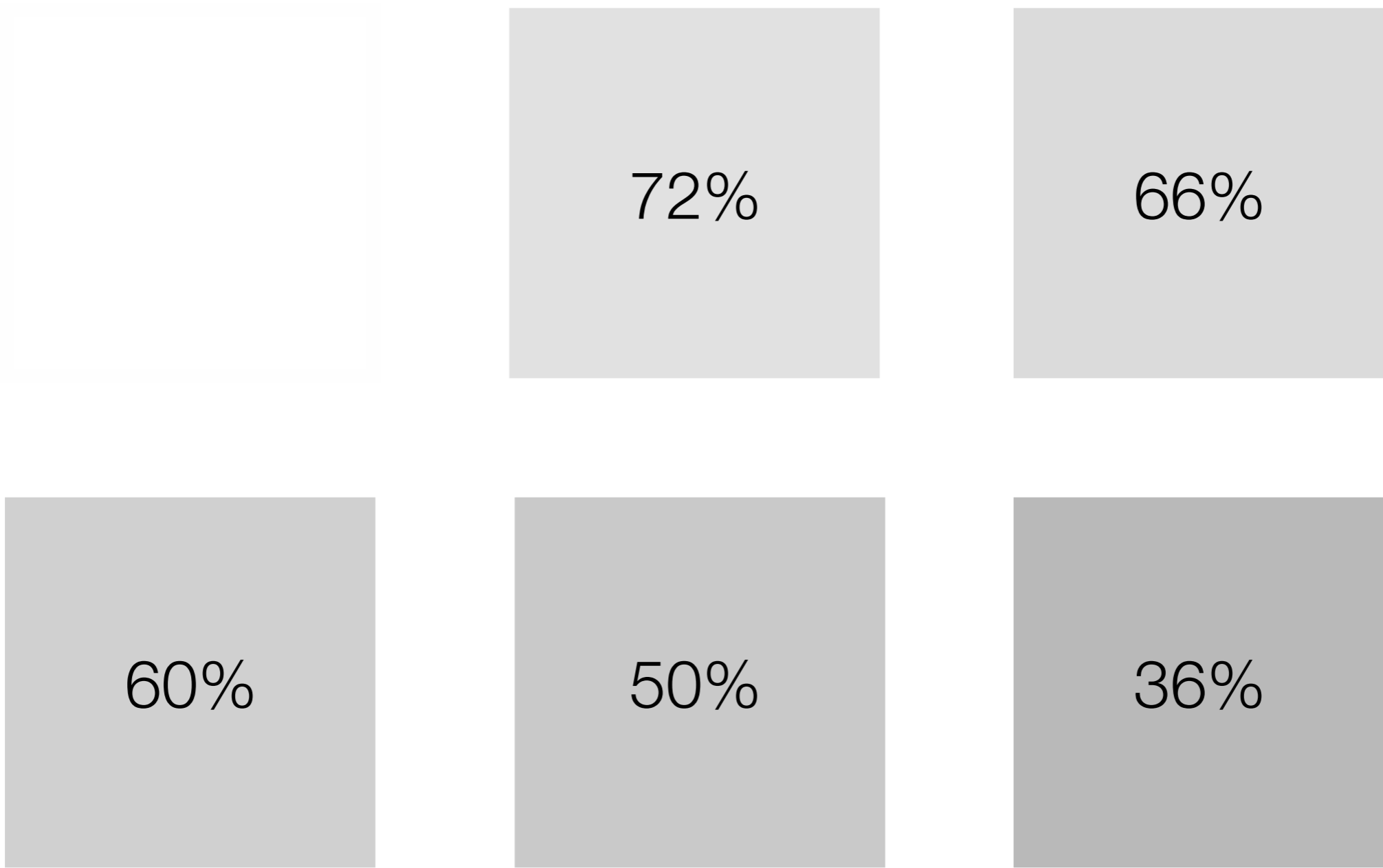


window section

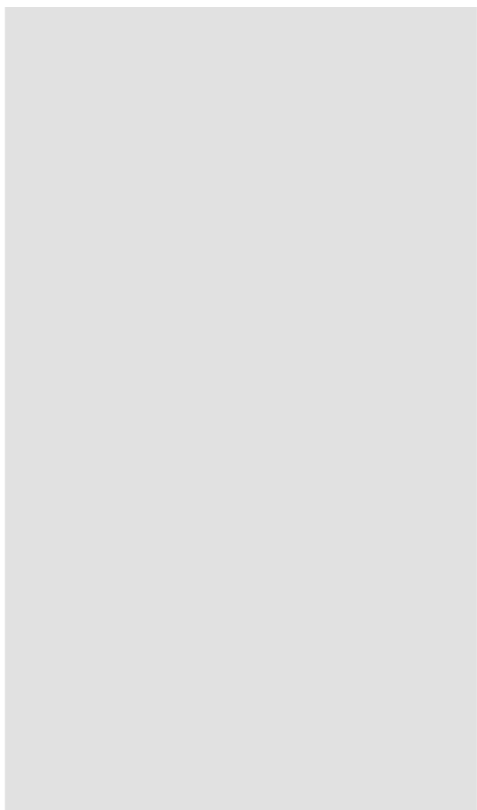
why have windows?



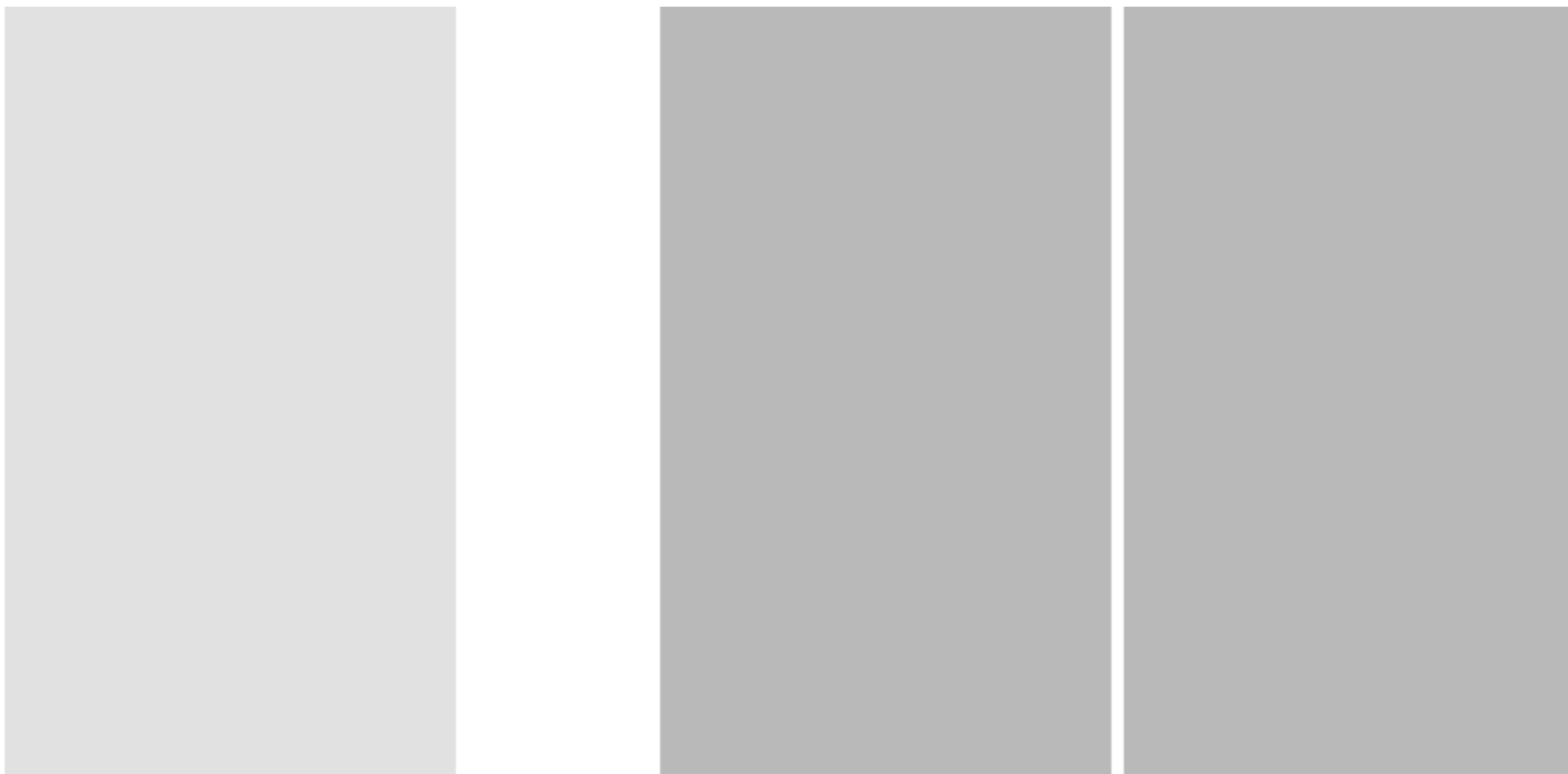
visible light transmittance



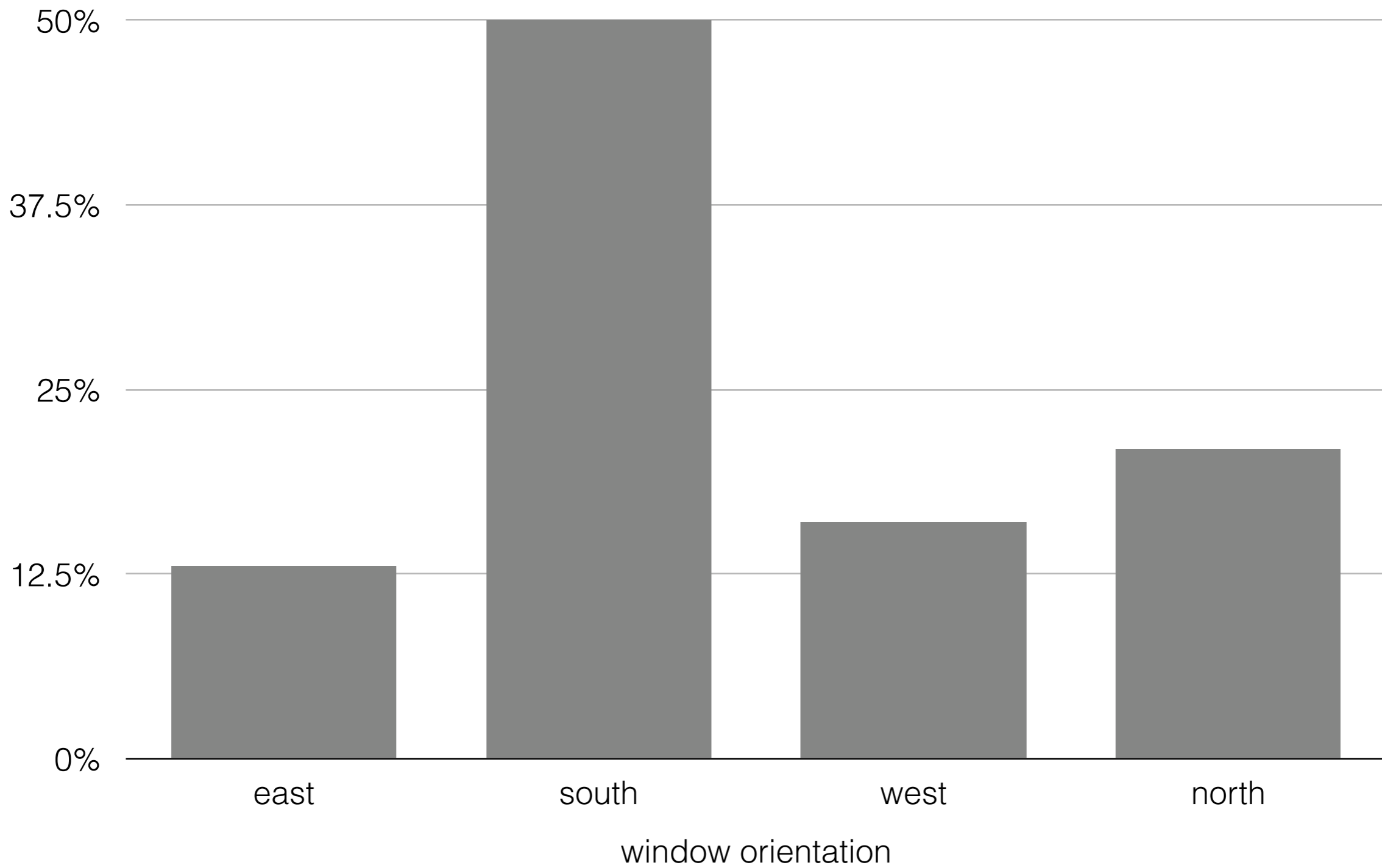
visible light transmittance



window areas



window areas





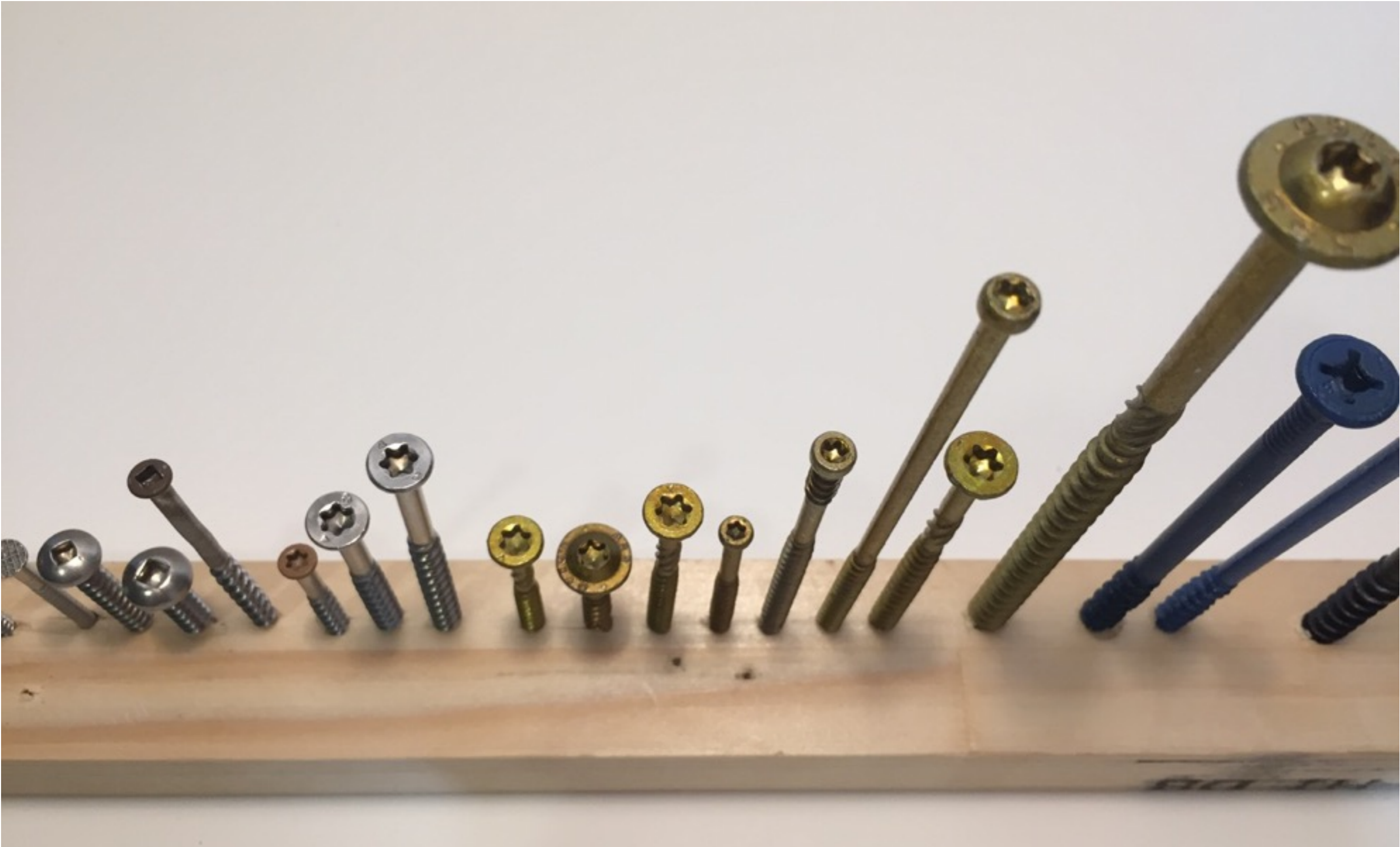
12:15 pm September 28th, 2014



12:30 pm October 20th, 2014



fasteners



heads and threads

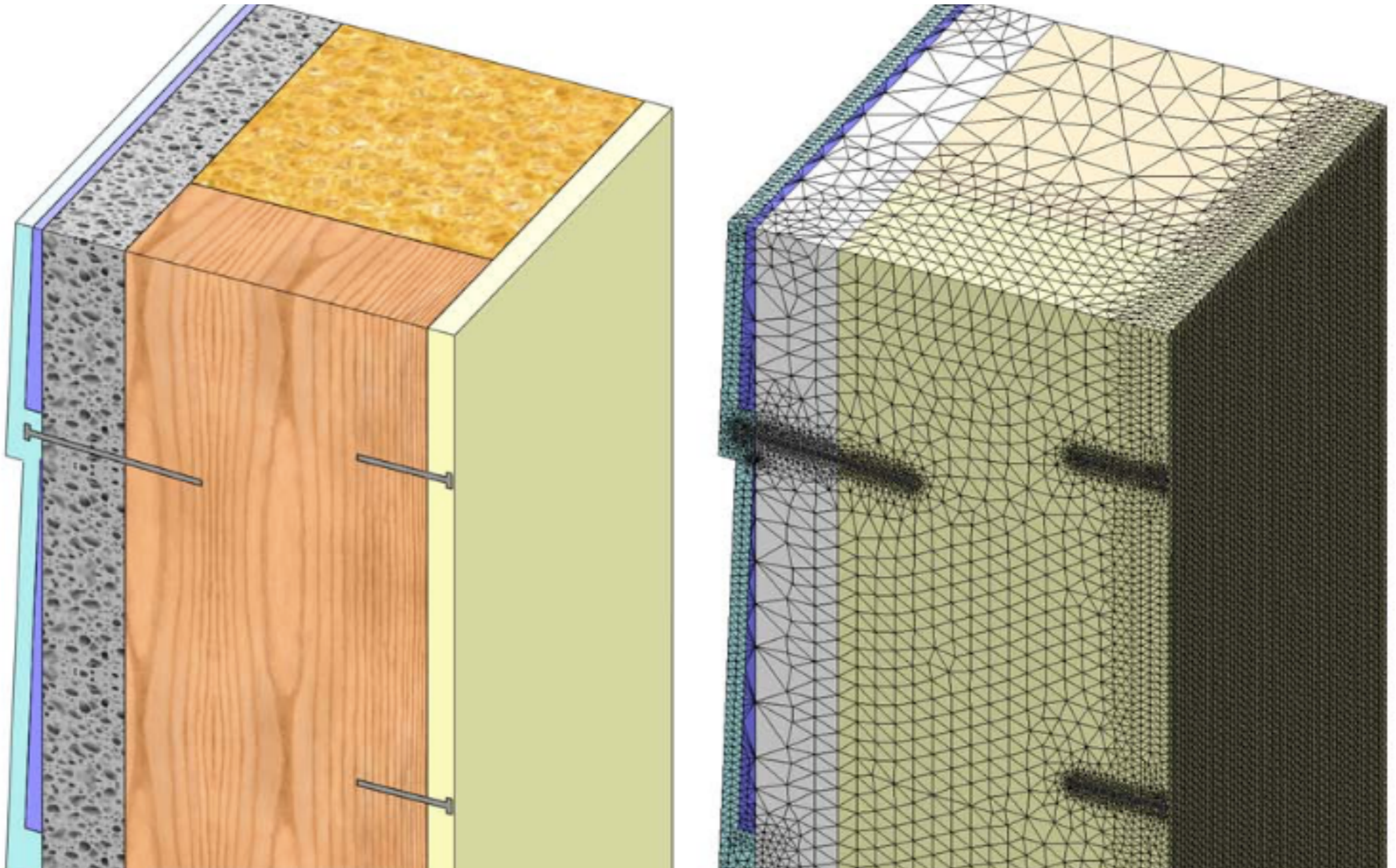


the full monty: fasteners, clips and bits

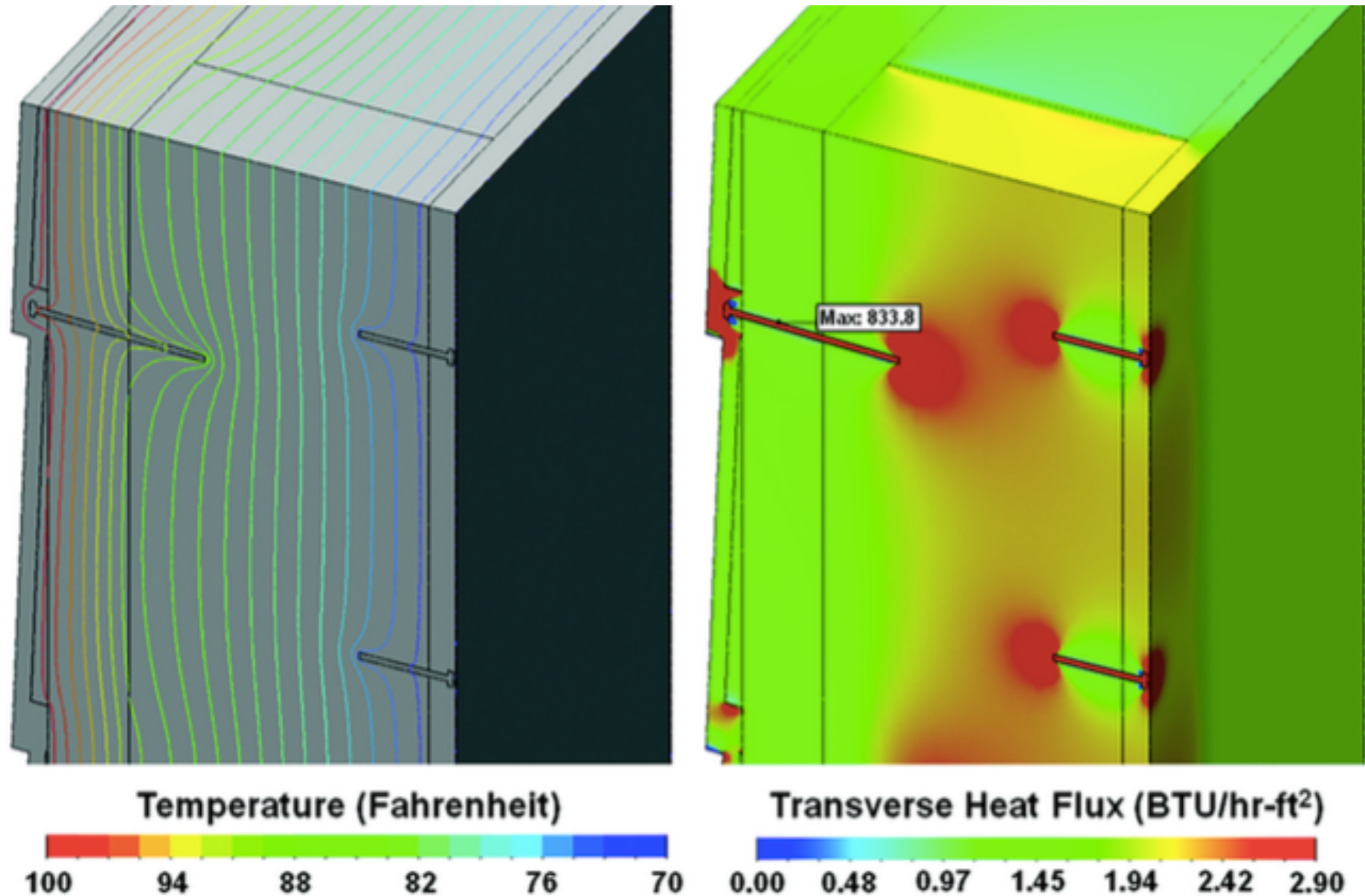
“It is impossible to observe everything, and so the observer has to give most of his attention to a selected field. But he should at the same time try to watch out for other things. Especially anything odd.”

–William I.B. Beveridge

carbon steel is 464 times
more thermally conductive than wood.



thermal analysis of siding nails and drywall screws using
finite element mesh



thermal analysis of siding nails and drywall screws using
finite element mesh



SIP nailing



conventional nailing



SIP nailing



conventional nailing

discovery is a creative act;
it uncovers what already exists.



more information about this project may be found
at: robertcurtisarchitects.com/unfolding

live solar production data available at: pvoutput.org