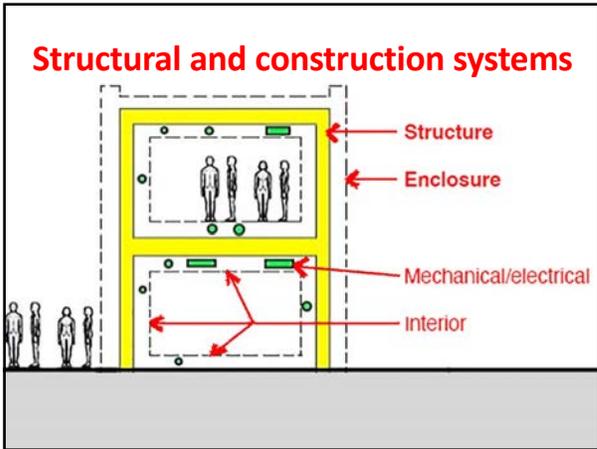


Construction Systems in Architecture

Jonathan Ochshorn
Cornell University, July 11, 2024

www.jonochshorn.com

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Construction systems

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I. Introduction

A. Performance criteria vs. Expressive Content:

- 1. Performance:** "The function of walls, floors, and roofs is to enclose space in such a way that some or all of the physical environmental conditions, either inside or outside the enclosed space, can be regulated within acceptable limits."

— Neil Hutcheon and Gustav Handegord, *Building Science for a Cold Climate*, 1983

4

2. Expression: "Almost every period of architecture has been linked on to research into construction. The conclusion has often been drawn that architecture is construction. It may be that the effort put forth by architects has been mainly concentrated on the constructional problems of the time; that is not a reason for mixing different things. It is quite true that the architect should have construction at least as much on his fingers' ends as a thinker his grammar. And construction being a much more difficult and complex science than grammar, an architect's efforts are concentrated on it for a large part of his career; but he should not vegetate there."



— Le Corbusier, *Towards a New Architecture*, 1923

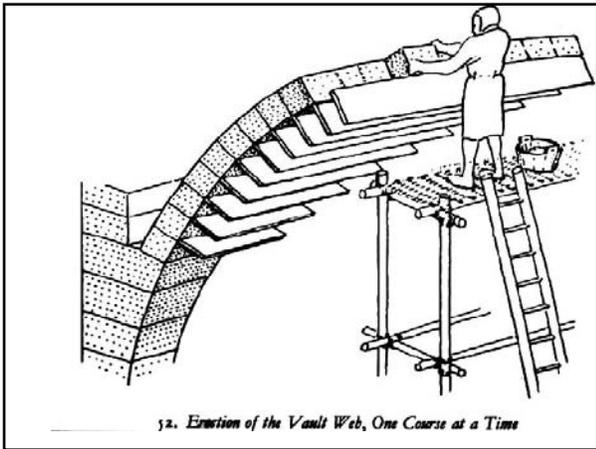
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3. Utility vs. intuition: "If one takes technique, utilitarian requirements, etc., as the point of departure, there is a risk of losing every chance of success, for intuition is then troubled by intelligence."

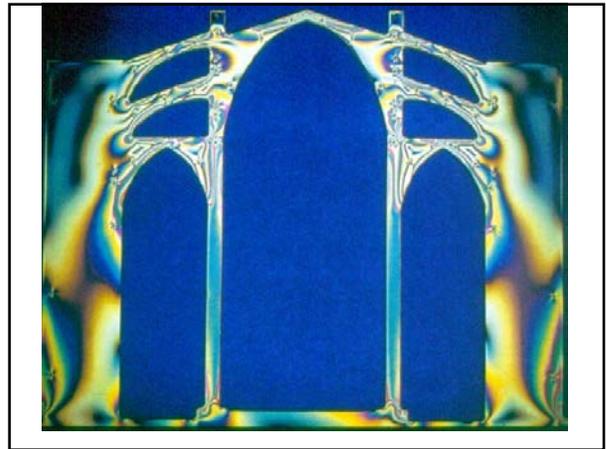


— Piet Mondrian, *L'Architecture Vivante*, Autumn, 1925

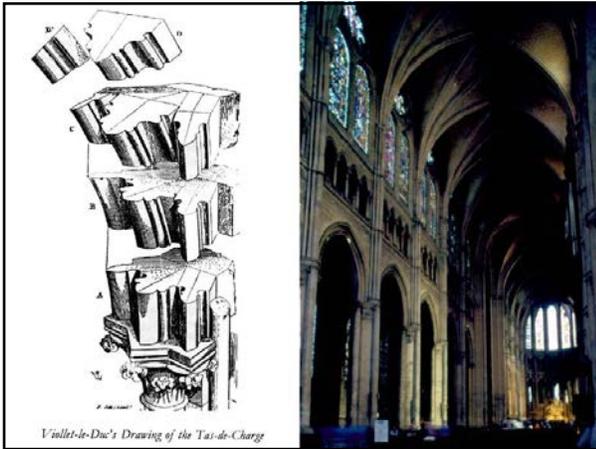
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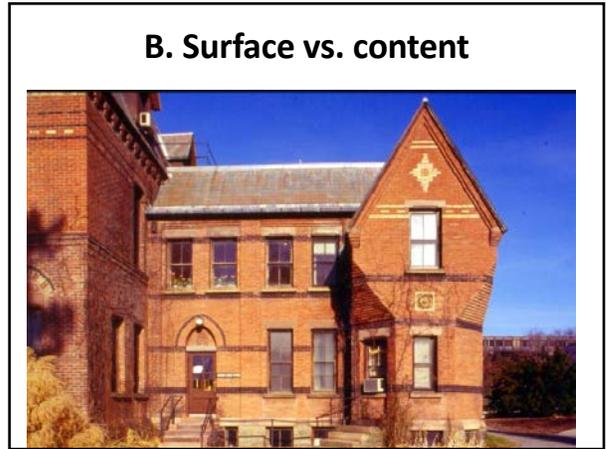
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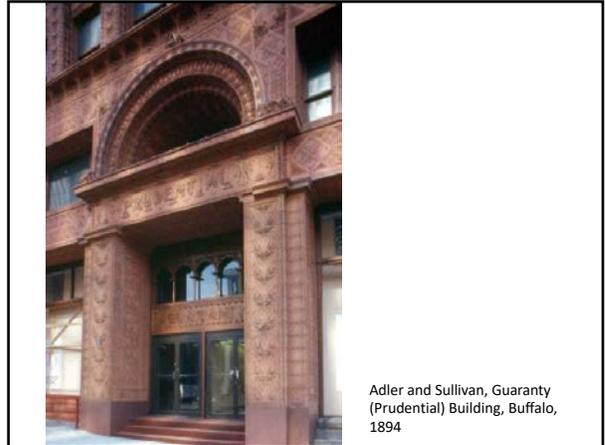
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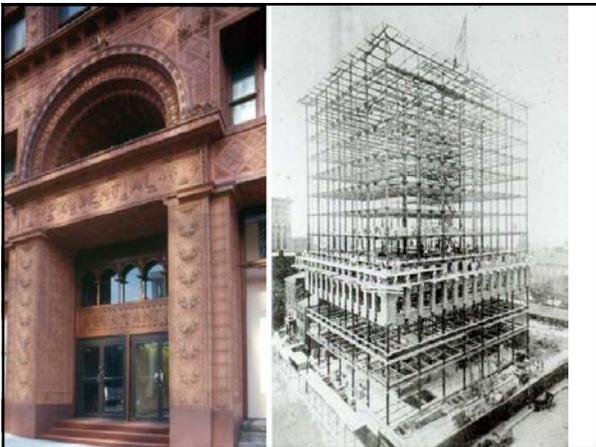
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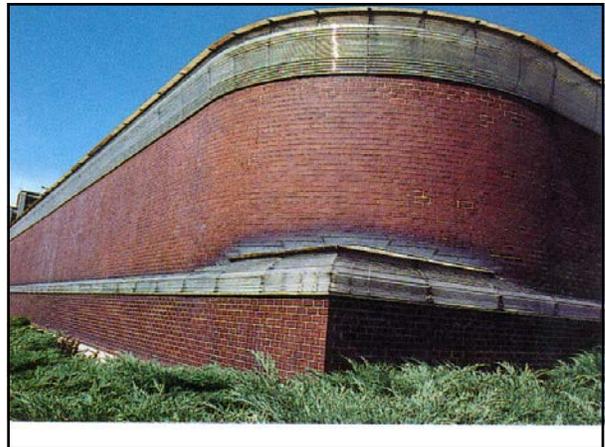
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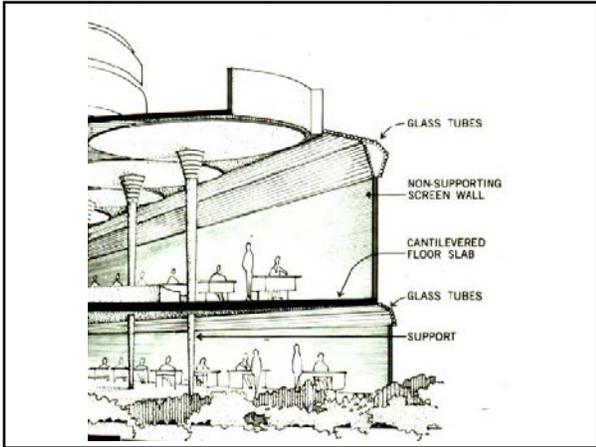
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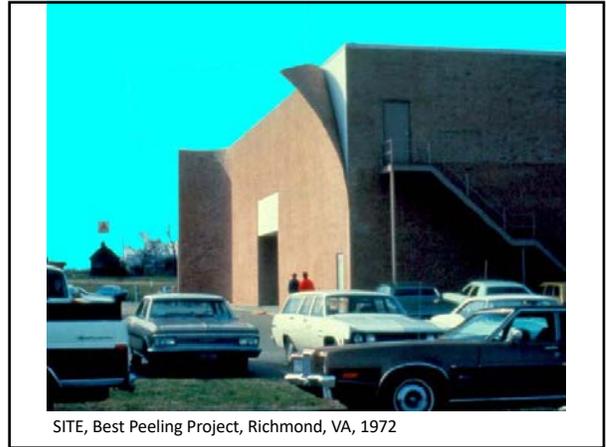
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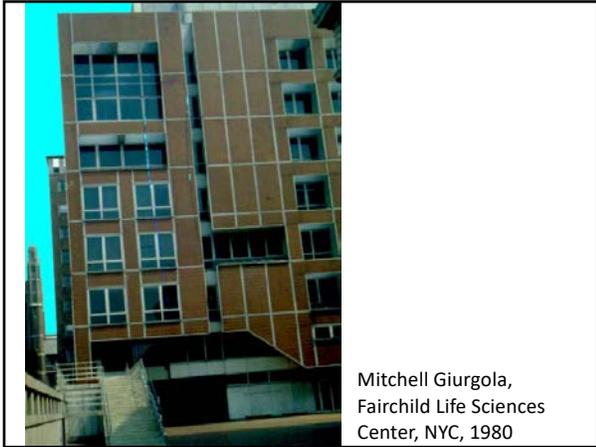


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SITE, Best Peeling Project, Richmond, VA, 1972

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Mitchell Giurgola,
Fairchild Life Sciences
Center, NYC, 1980

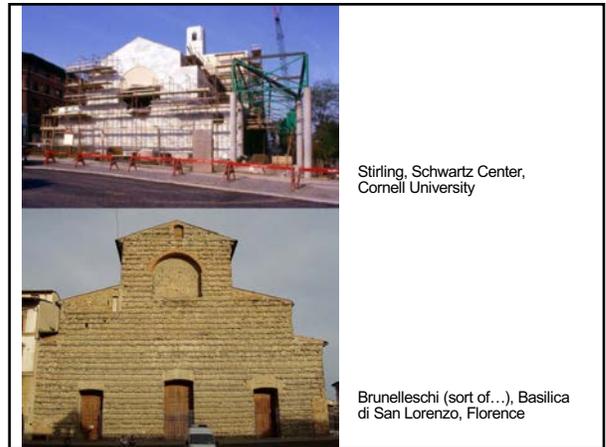
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Stirling, Schwartz Center,
Cornell University

Brunelleschi (sort of...), Basilica
di San Lorenzo, Florence

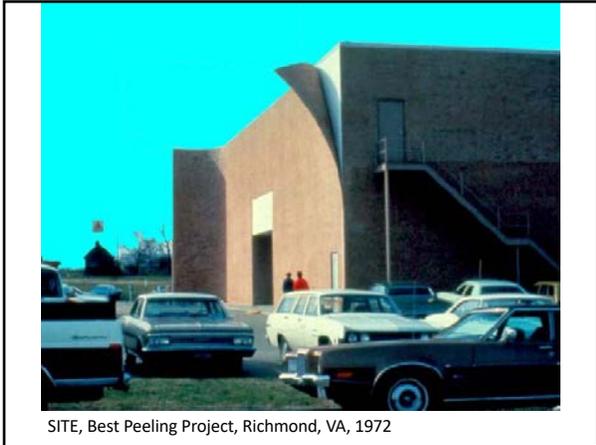
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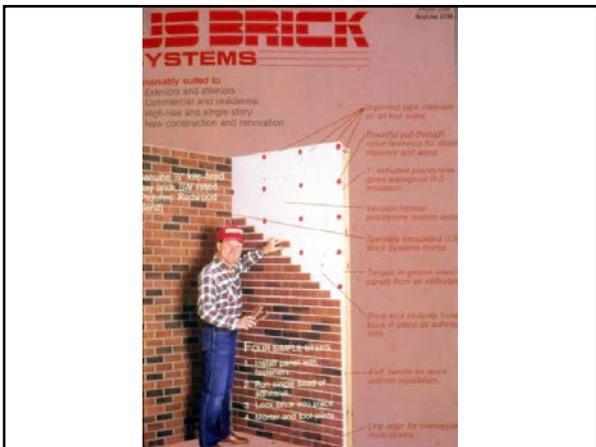


SITE, Best Peeling Project, Richmond, VA, 1972

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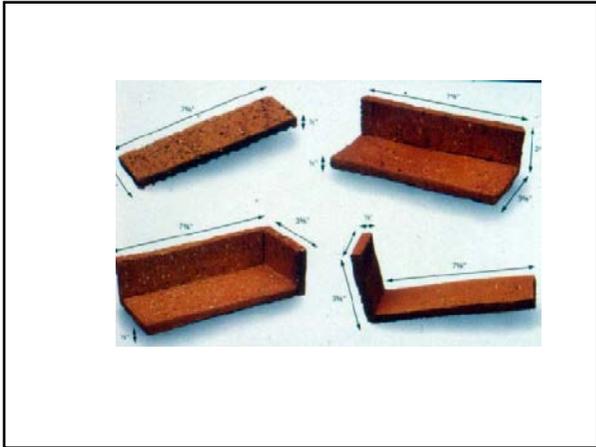
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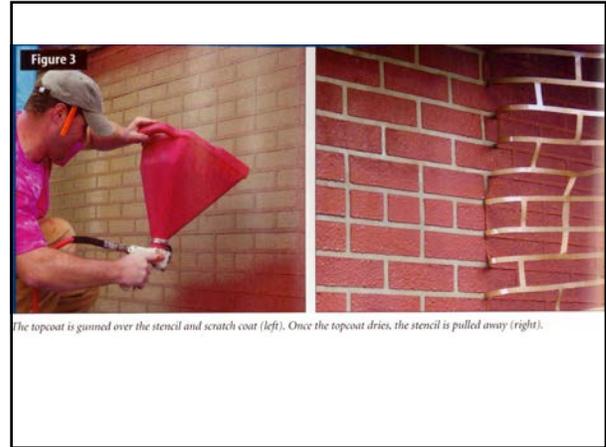
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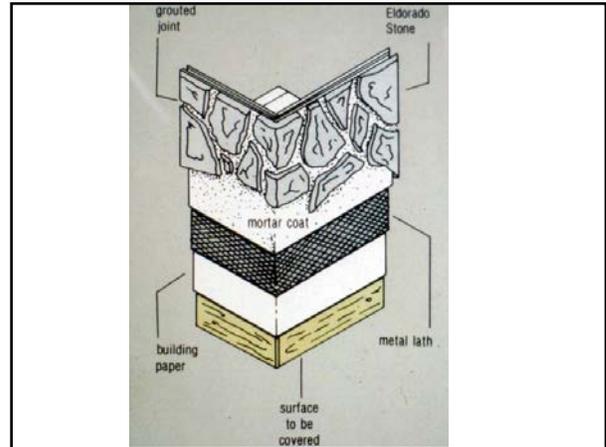
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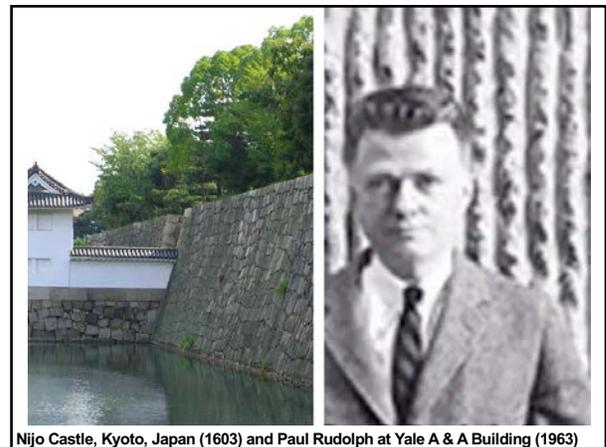
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C. Construction materials vs. systems

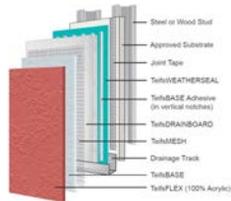
Materials

- “The Things to be prepared are these, Lime, Timber, Sand, Stone, as also Iron, Brass, Lead, Glass and the like.”

- --Leone Battista Alberti, *Ten Books on Architecture*

Systems

Exterior Insulation and Finish System



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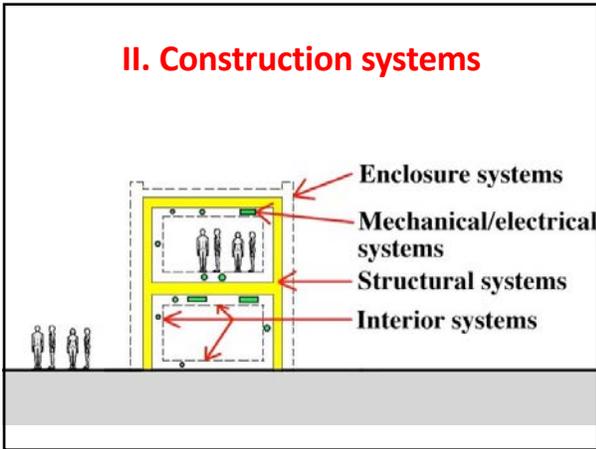
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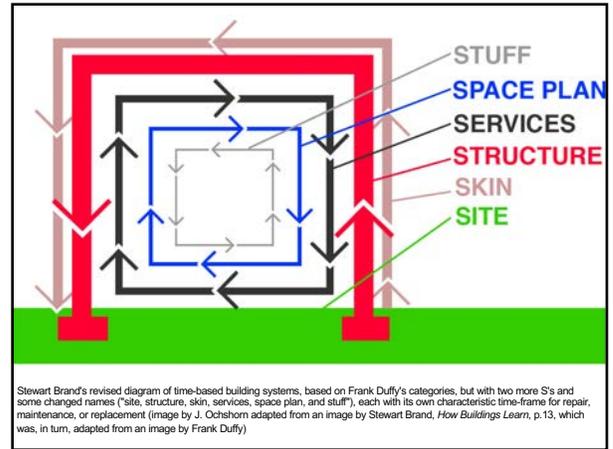
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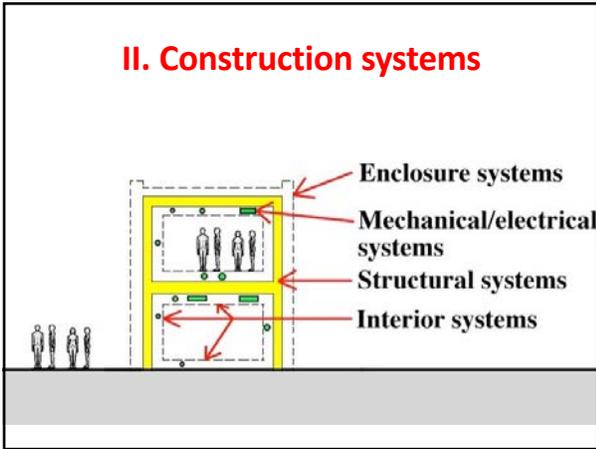
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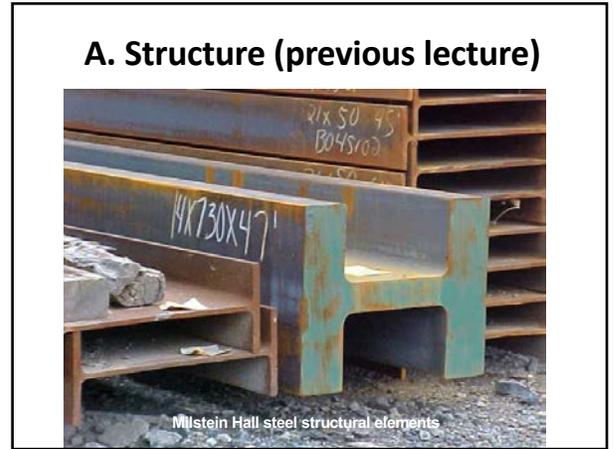
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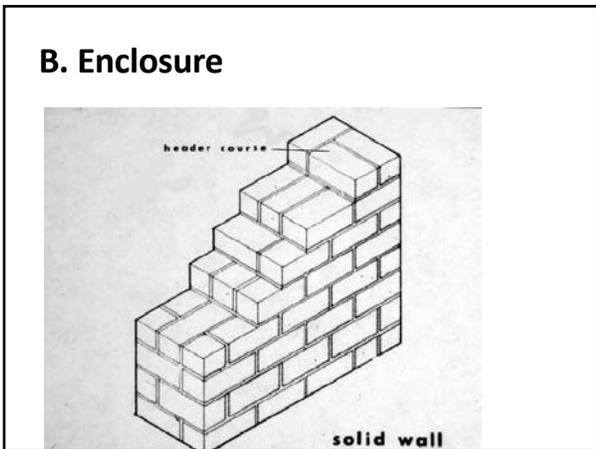
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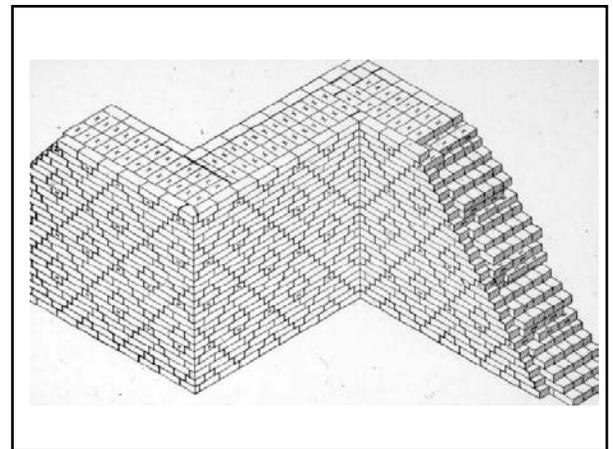
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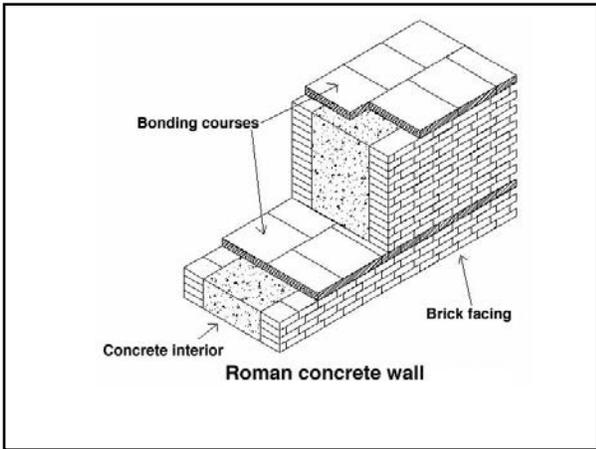
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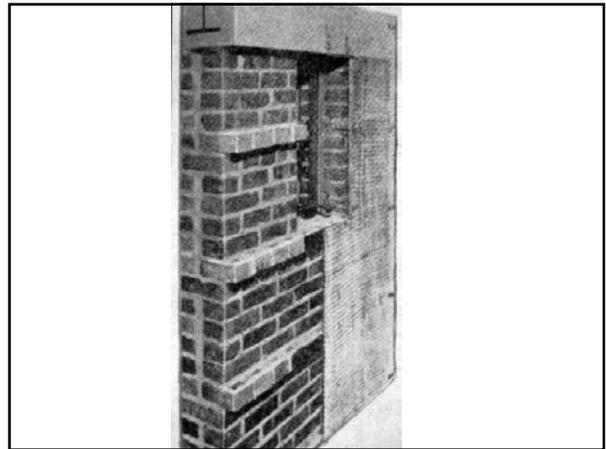
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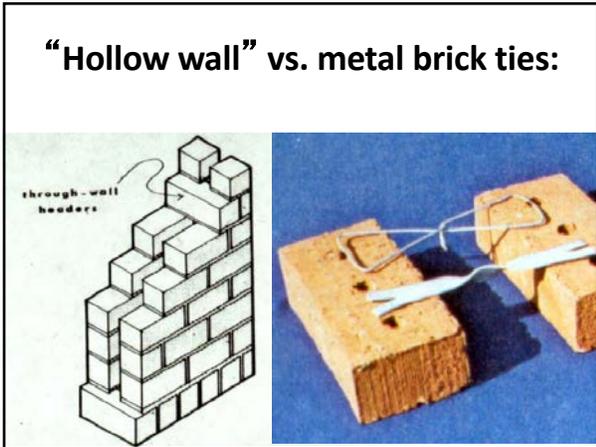
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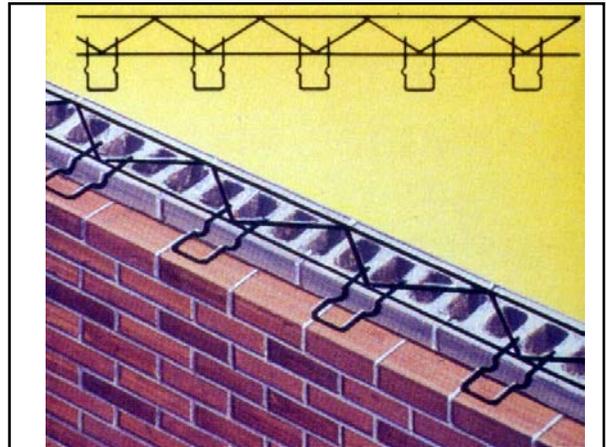
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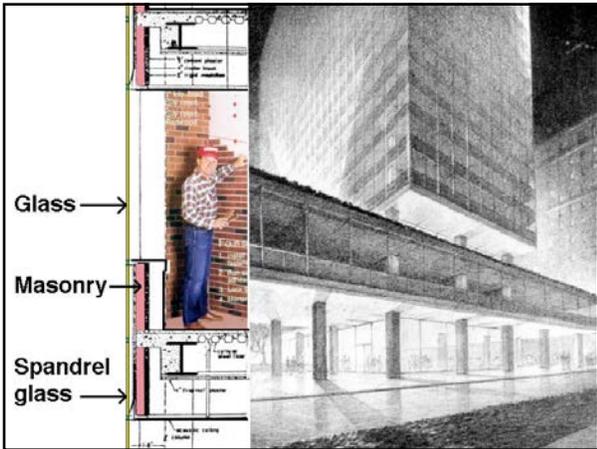
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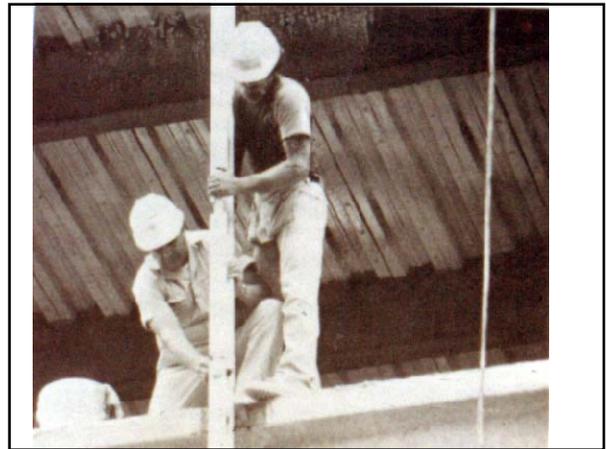
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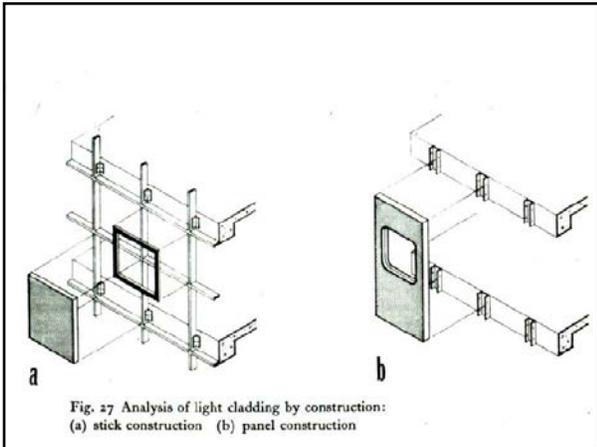
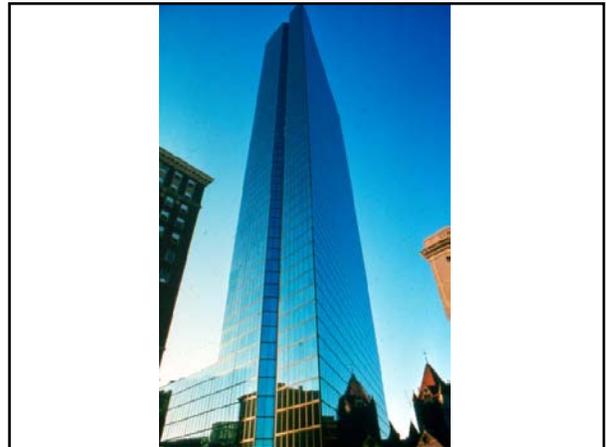
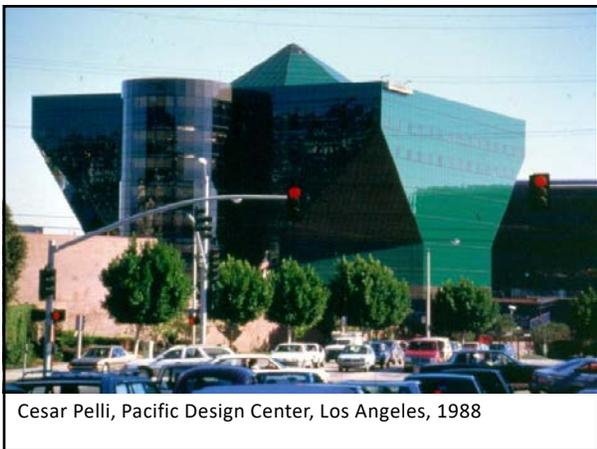


Fig. 27 Analysis of light cladding by construction:
(a) stick construction (b) panel construction

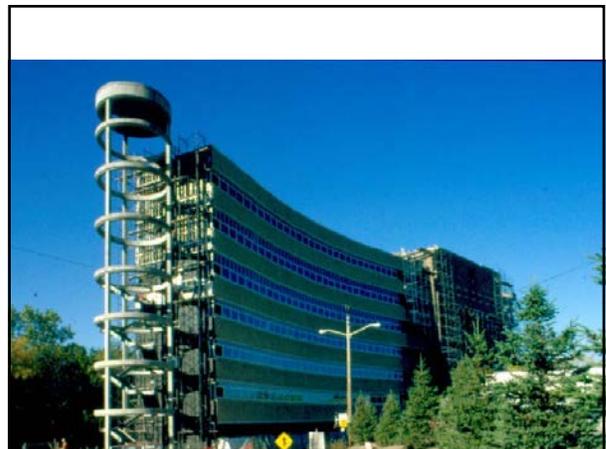
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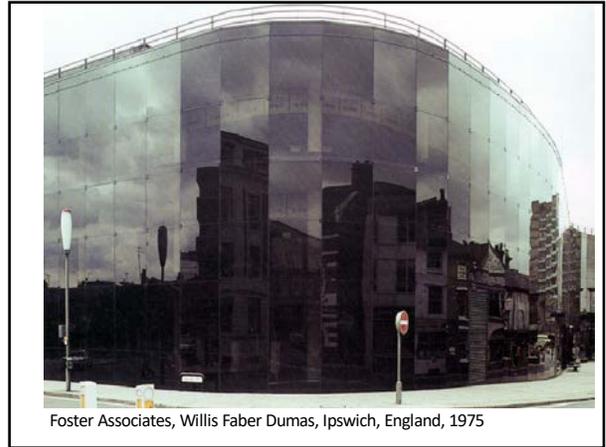
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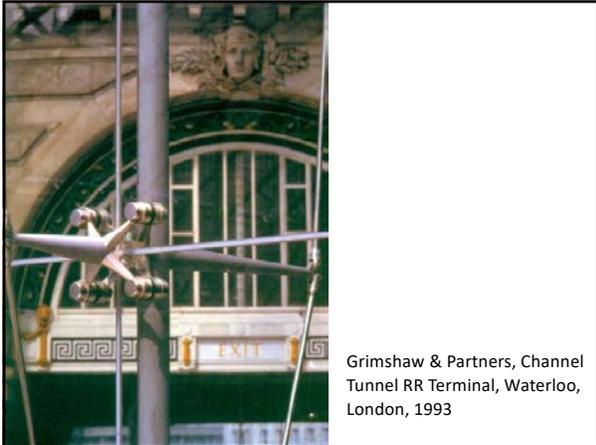


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Foster Associates, Willis Faber Dumas, Ipswich, England, 1975

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Grimshaw & Partners, Channel Tunnel RR Terminal, Waterloo, London, 1993

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Bohlin Cywinski Jackson, Apple Store (Fifth Avenue), NYC, 2006

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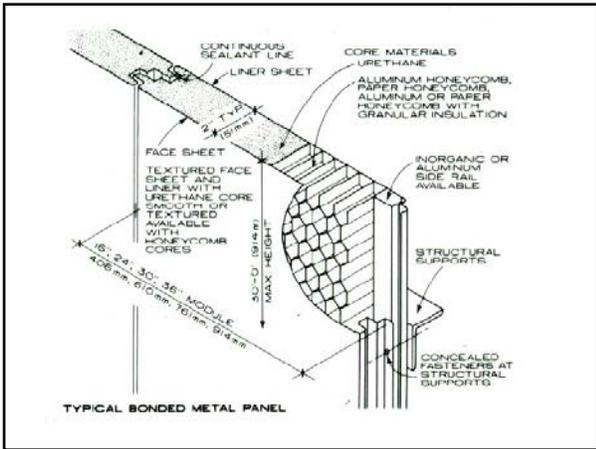
Bohlin Cywinski Jackson, Apple Store (Fifth Avenue), NYC, 2006

65



Under construction...

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69



Disney Concert Hall (Gehry, L.A.)

70



Frank Gehry, the Fisher Center at Bard College

71



Insulated metal panel exterior cladding fires: OMA (CCTV hotel, Beijing); Grenfell (London)

72

Reynobond® Natural Metals – Strikingly Beautiful. Naturally Bold.

Get all the functional benefits of Reynobond® along with the aesthetic appeal of natural and copper walls and formwork.

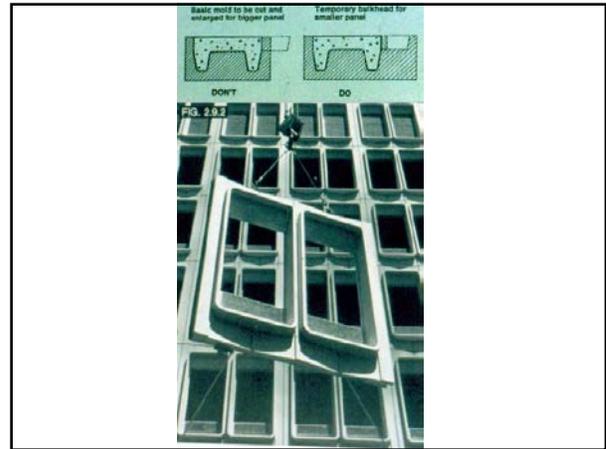
Grenfell Tower facade
 Cross-section of the outside of Grenfell Tower, showing the materials under investigation by police

1 Insulation layer
 Celotex R55000 has performed well in a number of fire tests, but it is combustible. Made from polyisocyanurate (PIR), it releases toxic fumes such as hydrogen cyanide when it burns

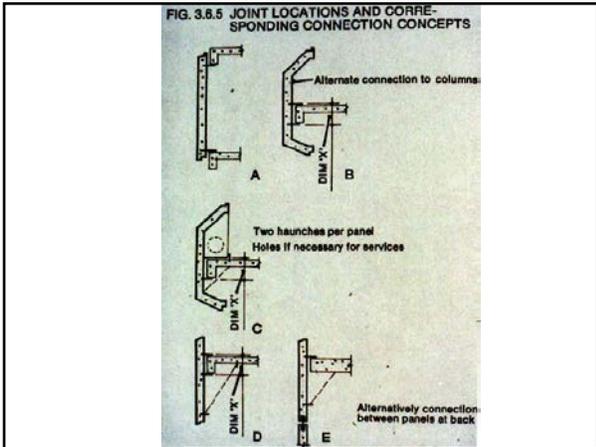
2 Air gap
 The air gap ensures that condensation on the building evaporates and doesn't damage the outer walls. The gap may have helped the fire spread through a 'chimney effect'

3 Cladding
 Reynobond panels used on Grenfell Tower sandwich a layer of polyethylene between two aluminium sheets. The panels are flammable and official building regulations recommend that only panels with non-combustible cores are used on buildings taller than 18 metres

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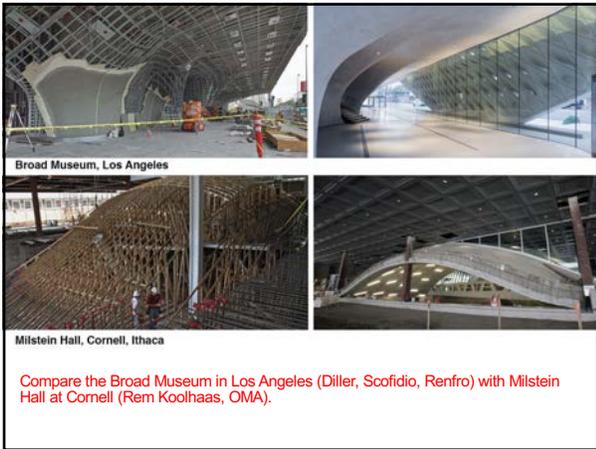
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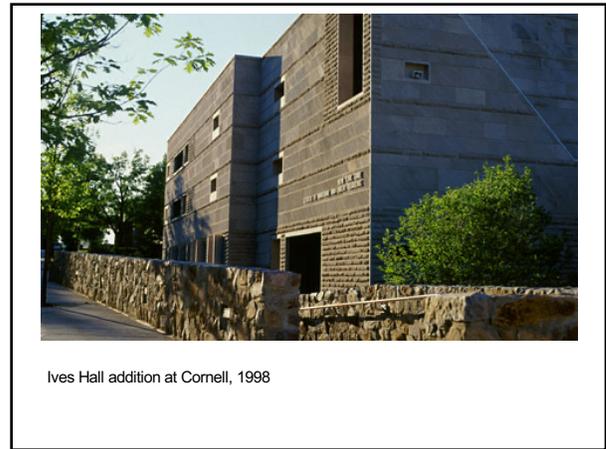
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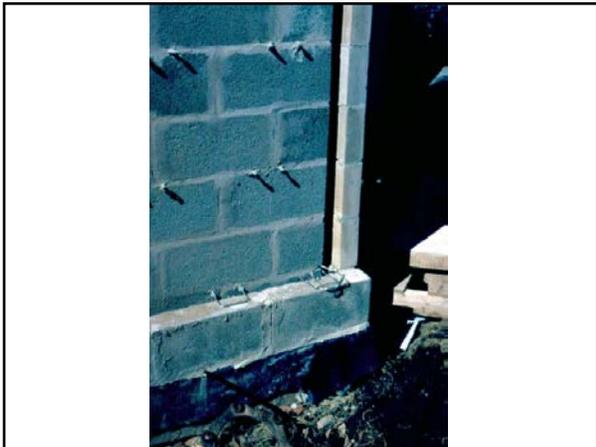
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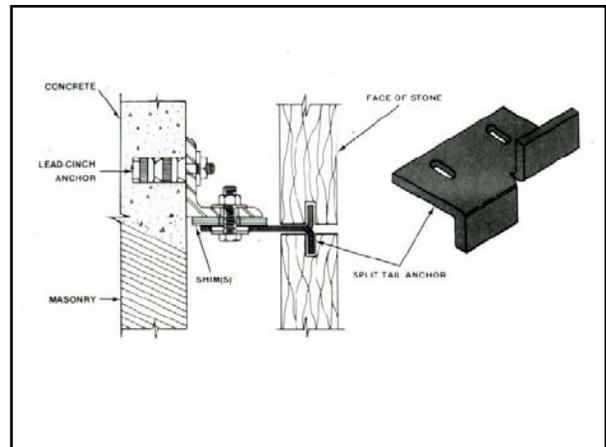
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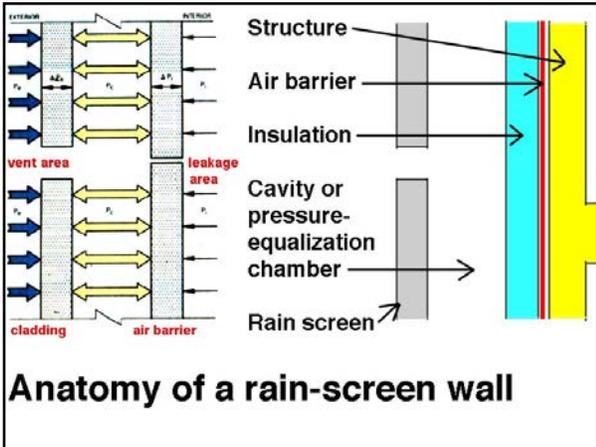
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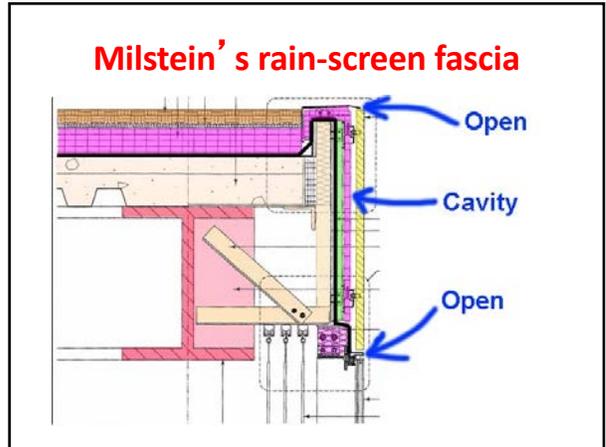
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C. Interior systems

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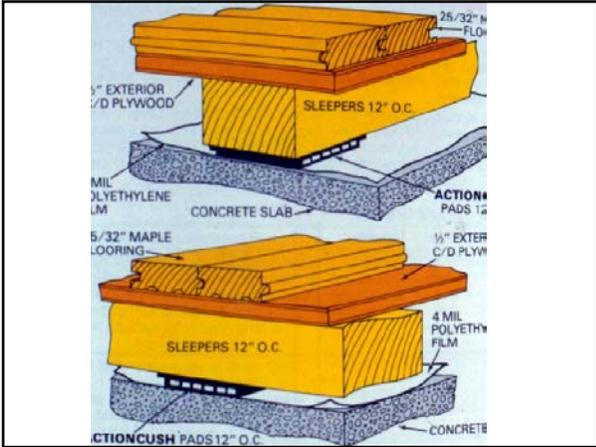
Floors



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Walls



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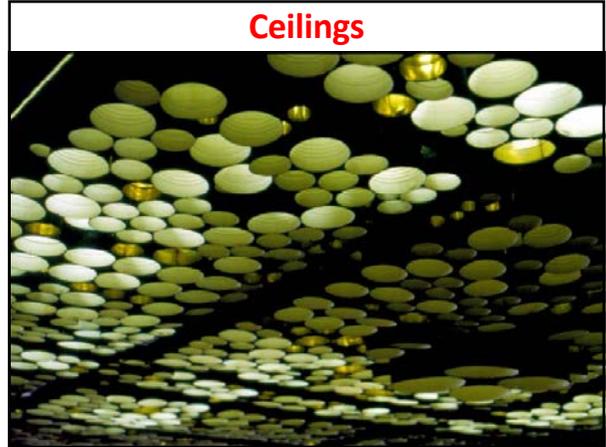
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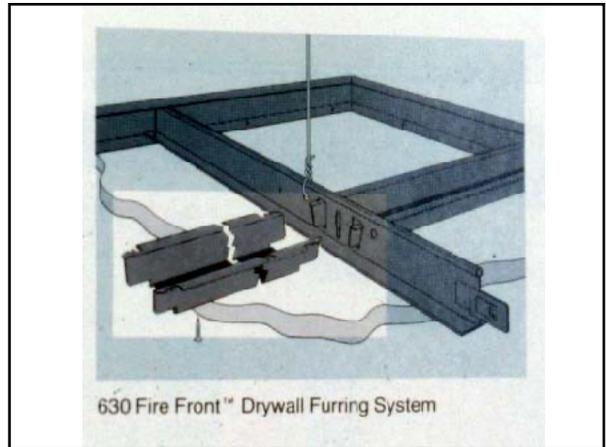


Ceilings

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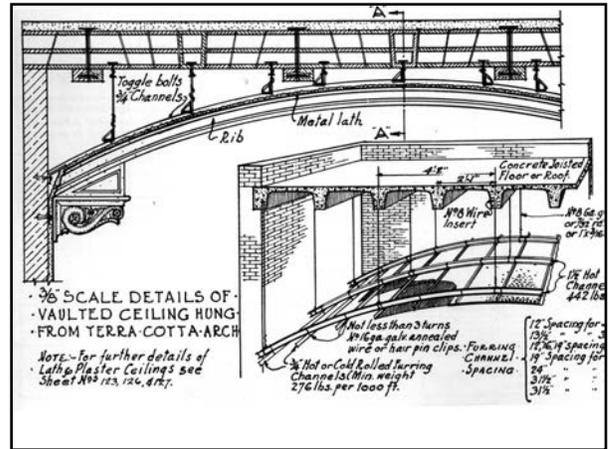
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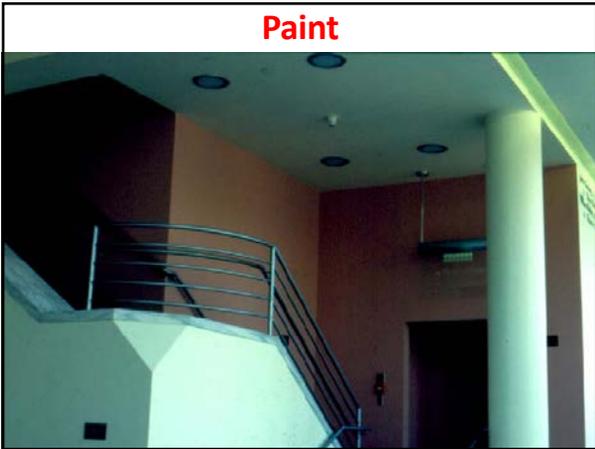
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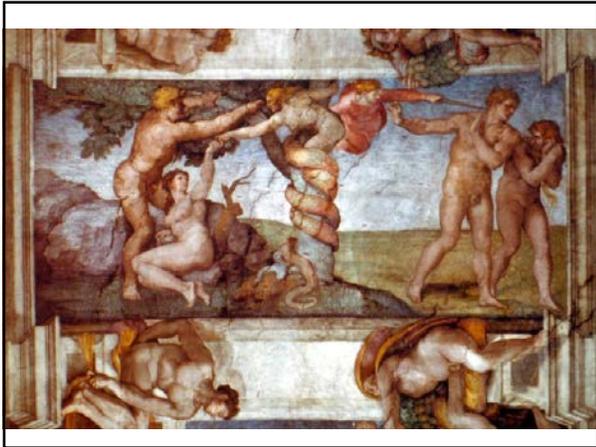
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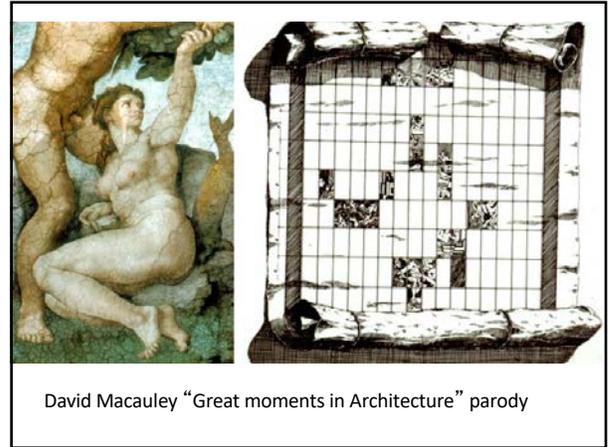
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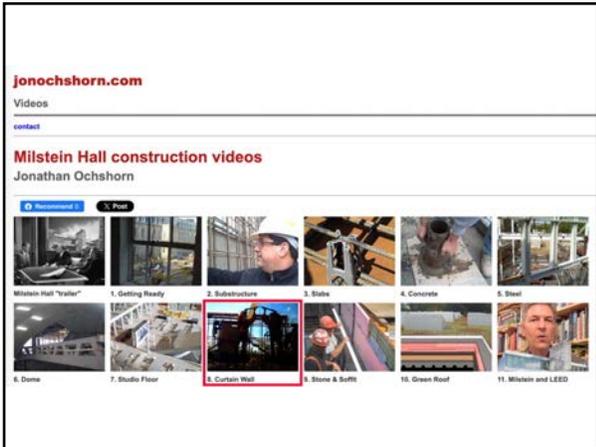


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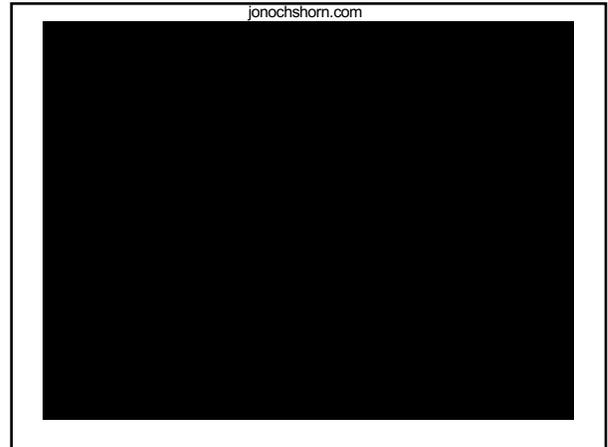


David Macauley "Great moments in Architecture" parody

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