

# The *Re-Presentation* of Designed Technical Courses

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Schools of architecture have always stood a little apart from the everyday demands of the profession and the marketplace, as indeed they should. But how far can that divergence go, before the implicit guarantee that the school prepares the student for the world of work verges on dishonesty?

- Andrew Saint, Senior Historian, London Region of English Heritage

Architecture courses on construction materials and building assembly have been the single most visible link to professional practice offered from academic institutions. National accrediting and review boards look to these courses along with structures and mechanical/electrical systems, to assure the practical capabilities of the students. On the other hand, the specific nature of the information often conflicts with studio design processes that encourage a theoretical, broadly defined base of information. Many schools face a dilemma;

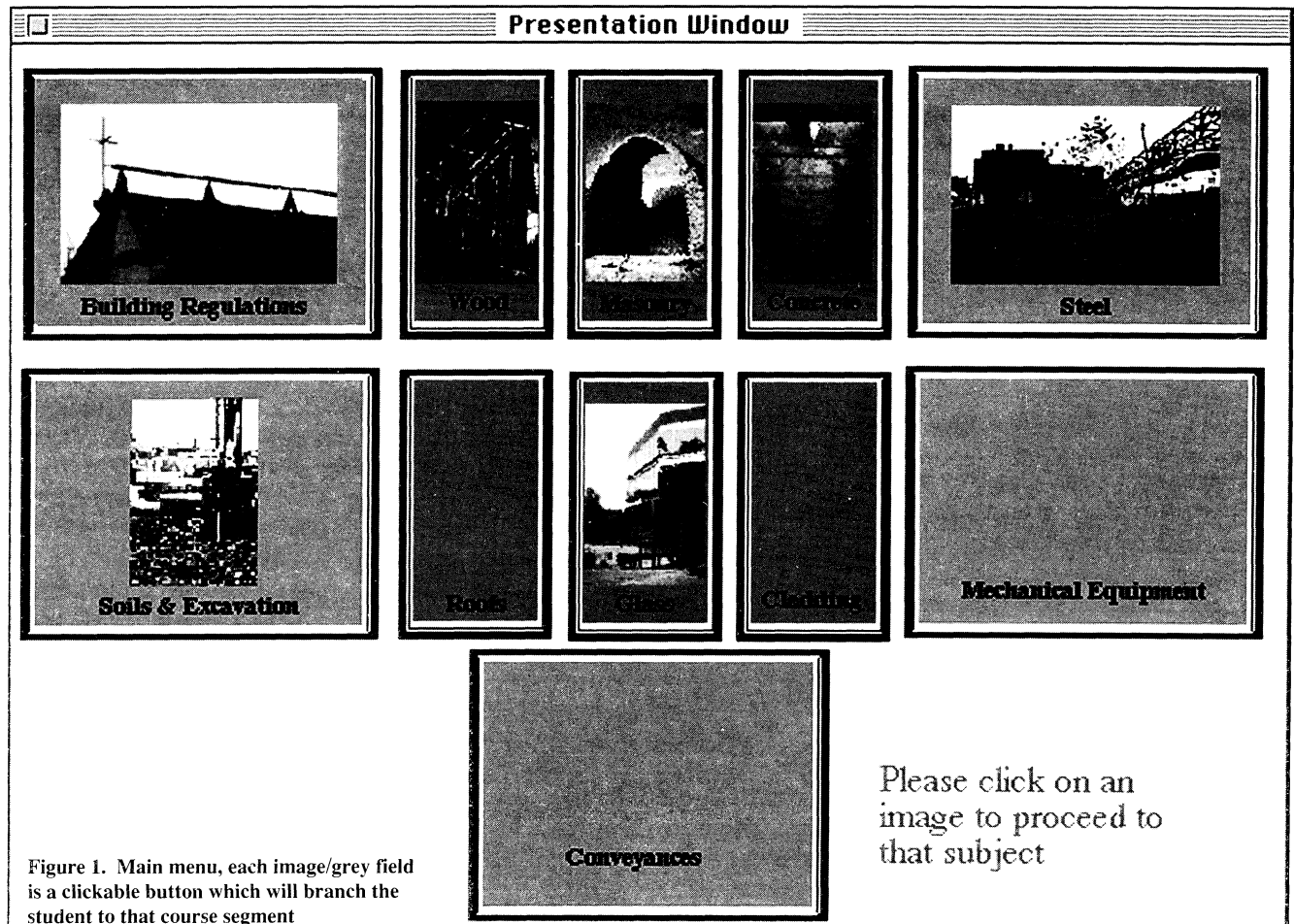


Figure 1. Main menu, each image/grey field is a clickable button which will branch the student to that course segment

professional accrediting and review boards embrace the more technical course content while the design oriented faculty argue for its suppression.

There are several proved mechanisms to overcome or diminish the aforementioned dilemma. The student often sees one faculty for design studio and another for technology courses. When both courses are taught by teams, the student sees the same faculty for design and for technology courses. In addition, the technology information may be taught *within* the studio, as opposed to *in addition to it*. This studio model has a strong pedagogical intent of *correlating* the two realms (as opposed to integration). When the pedagogy of correlation directs the curriculum, the previously mentioned conflicts are diminished or eliminated. Another essential component, often overlooked, is the notion of *Research* informing the unified design and technical studios. We have proposed a stand-alone tutorial that combines faculty research in tandem with the concept of the studio-technique model. This tutorial uses emerging interactive digital technologies in a professional graphic manner allowing for the *re-presentation* of specific and general technical issues.

The educational environment, both for teacher and student, is dynamically stimulated by the continual presence of research activity. The faculty based, student involved, research incorporated into this tutorial spans two specific areas

of design/technology involvement. The first is the on-site construction of both conventional and innovative construction practices, transformed through digitized video clips, CAD drawings, animation's, slides, scanned photographs and other recorded documents. These elements of information have been generated by the faculty both in related construction projects by other architects and those designed and built by the faculty.

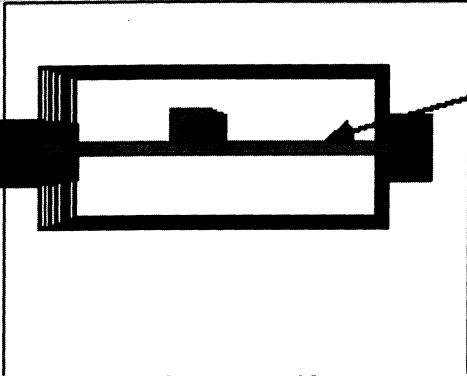
The second area is that of digital technologies and the interactive user interfaces associated with visual communication and learning. Although this is a form of technology itself, it is also a powerful tool in communicating in a clear, graphically stimulating format, the necessary construction materials and technical assembly issues otherwise delivered in non-interactive lectures.

This tutorial takes the form of a single CD-ROM to be accessed by either a Macintosh or Windows environment. This tutorial makes a digital base from which students can plot their own path and pace through technical sequence courseware or simply use it to increase their knowledge base in a specific area. This digital knowledge base and system will assure presentation of the critical information in a multimedia, user interactive, format.

This tutorial will directly assist the undergraduate and graduate level courses in building technology that are re-

Presentation Window

## Hotel Street



The egress path from the rooms are connected to the stairways by the corridor.

The corridor is fully enclosed by fire rated walls, floors, & ceilings. In addition, all doors opening from corridor to rooms are fire rated as well and are equipped with self closing devices and weatherstripping to prevent the passage smoke and hot gases.

**Each corridor must have two ways out in case one path is blocked by smoke, fire or debris.**

Corridors must have a minimum width of 44 inches under most model codes and a maximum length of 100 feet to each exit stair or building exit.

**Most model codes allow for an increase in the maximum distance to an exit stair if automatic fire sprinklers are provided.**

Figure 2. Excerpt from the regulatory section, note that the continue button gives a simple form of continuity for navigating the interface

Continue

quired for graduation. These courses introduce the fundamentals of construction as it is practiced in the U.S. while folding in the historic development of the material or systems. In addition, it introduces the process of manufacture and grading, on-site assembly and architectural design opportunities. This is all within the regulatory framework of building codes, accessibility standards and hazardous material handling and control.

The quantity of information in this area is constantly expanding. This forms a flexible data base that makes the information relative to the students professional intents. Students often need technical information at different times, depending on their interests and professional development. An Art and Architecture Library based CD-ROM format tutorial, available on demand, would address the *education driven* demands of the students while assuring state-of-the-art information. This will consequently free up faculty time for demonstration, expansion into specialized topic areas or into applied, student based research projects. The hardware would be cross-platform (Macintosh and MS-DOS Windows) based.

Although this approach to the technical courseware is self-paced, the faculty may act as *tour-guides* through the information. This allows a common data base to be negotiated differentially by faculty or by level. Levels may vary depending on graduate or undergraduate or beginning or advanced. Advanced students, through their own or faculty initiated research, will add to the data base and plan various strategies for journeying through it. The courseware is still tied to the allied studio/classes where the faculty are able to develop their own daily or semester structure relative to the information. Testing will also be digital based. Testing questions would come from the extensive data base and be capable of changing quickly and be relative to the level of study undertaken.

The value and relevance is clear in the potential capacity to raise professional competence and to develop a solid, yet fluid, reference tool for all students and faculty. A significant benefit of this tutorial is that it may be used as a stand alone course, support for lecture courses or as a library reference.

The interface being used is *Authorware Professional 2.02.0 us* by Macromedia. This software utilizes icons, that can be placed in strings, that allows the creator to make up files of individual interactive pages. These pages, when grouped, can become like chapters. As chapters they can be mapped into a directory allowing the user to move between topic headings on demand. The icon maps are accessible only to the creator of the tutorial. The completed tutorial is "packaged" for use but does not allow for changing the operating icons or commands. This package is then transferred to a storage medium such as a *Bernoulli* cartridge, optical disk or CD-ROM.

The interactive components include push-button, transparent hotspots, hypertext and pull-down and pop up menus. A student logs on with name and social security number and

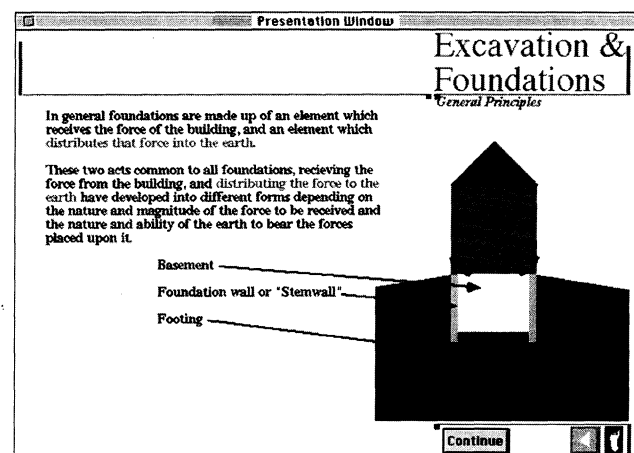
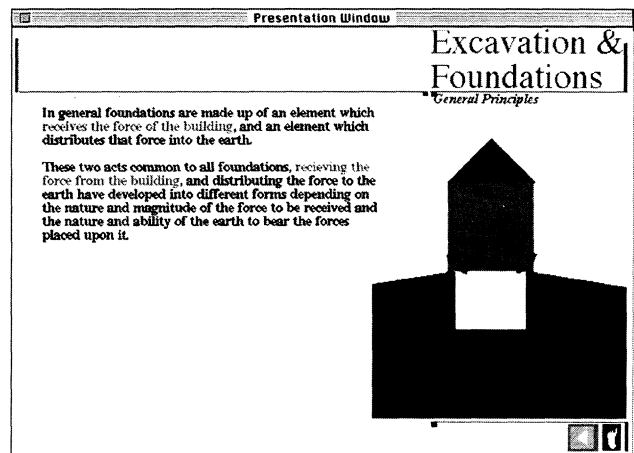
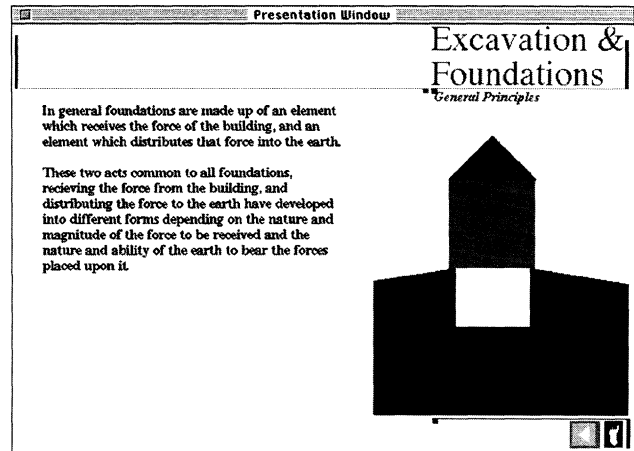


Figure 3, 4, 5. This sequence of overlays adds elements to the base graphic in red to add emphasis as the student reads the text.

is confronted with a visual menu of topics. The student then activates one of the topics by clicking on it with the mouse. A secondary menu then comes up for more specific topic areas.

This tutorial is an attempt at designing and re-presenting the notion of an information synthesis. Information that draws from the design studio, applied faculty research and issues of technology. In this situation information is often not designed but is rather collated and applied to design. The CD-ROM provides information, on student initiated demand, affording them the opportunity to visit a site via video tape segments, quickly access a construction sequence via computer animation's or locate a brief history of a particular construction material or assembly. The speed and ease of use allows the faculty to access the same information in any sequence, while delivering a talk or lecture on the subject matter.

At this stage of development, the courseware content has been built upon image sets and video clips currently in use (in non-electronic) the courses. The project is perhaps twenty percent completed and has modules begun in the following topics:

#### Regulatory

- General principles of life safety and egress paths
- Accessibility as a Civil Right
- General principles of zoning and covenants

#### Soils & Excavation

- General principles of soils exploration
- General principles of foundations
- Drilled Caisson foundations

#### Wood

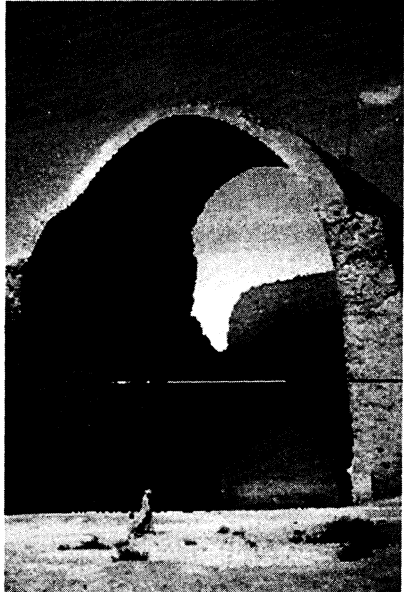
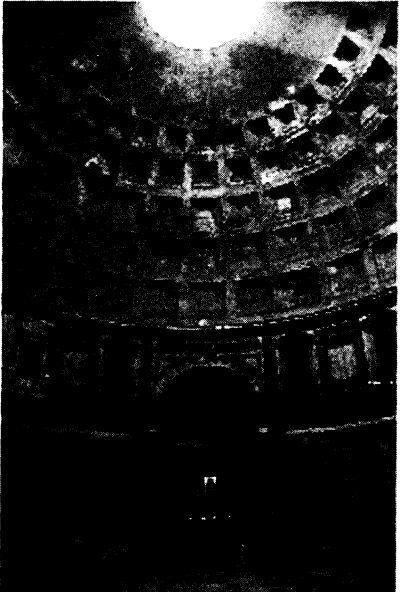

- General types & Species
- Product types, dimensions, terminology
- Failures in light wood framing
- Prefabricated Modular light wood framing
- Heavy Timber Construction: introductory
- Contemporary Timber Frame construction case study
- Architectural opportunities in light wood framing, Shakers & Thorncrown Chapel

#### Masonry

- History and general introduction
- Brick production and dimensions
- Block production and dimensions

Figure 6. Sample screen from Masonry - Historic Origins



Presentation Window

 <p>Sassainian Vault, Iraq    86' span, built about 850 B.C.</p>	 <p>Pantheon, Rome, Italy. Built around 432 A.D.</p>	 <p>Monastery church ceiling, 1530 A.D. Ixmilquilpan, Mexico.</p>
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**refinement of the same unit masonry building techniques used in the Sassainian Vault, almost 700 years earlier. The later developments included the design of the masonry squinch and pendentive. The masonry squinch is illustrated in the photograph on the right. The massively thick walls of the Pantheon resisted the**

FOOTNOTES: Photo credits;  
Left to right: National Geographic Society, A. J. Davis, AIA, A. J. Davis, AIA.

Continue

Brick was originally hand-shaped and sun dried, reinforced with straw or dung, and easily worked with into many different shapes. It wasn't until around the third millenium B.C. that kiln-dried and wood molded bricks appear.

Entire masonry shelters were likely simple domes rather than arches because they could be built with circular, successive layers of bricks slightly corbeling inward. Evidence of unit masonry arches date back to about 1400 B.C. The arch went through extensive refinement under the Romans when *centering* (the act of placing a temporary structure, usually wood, under the arch during construction to support it) was used to accomplish a wide variety of arch shapes.

The Tomb of Cyrus II is a clear example of simple quarried stone blocks of two sizes (one size for the plinth and another for the tomb) stacked, with a short span vault roof. Blocks were often moved with the use of Lewis devices.



Tomb of Cyrus II, Iran; approx. 550 BC

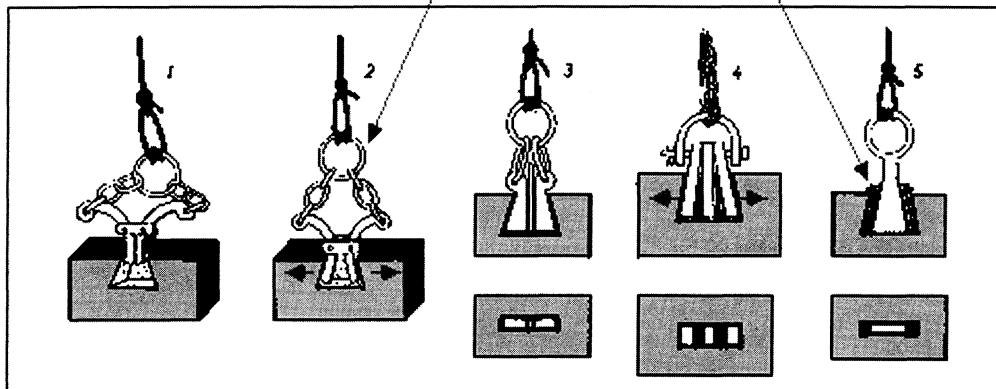
Figures 7, 8. Blue color emphasis on text identifies it as "clickable" (similar to Hyper text in Mosaic) Figure 8 is the screen which is displayed when the blue text "Lewis clips" is clicked, giving a graphic definition for the technical term.

Continue



Lewis  
(A device for lifting block)

Lewis pins



a

FOOTNOTE:  
Reference : L'Elogio Della Tecnologia; Sposito De Giovanni, Conti, Palermo Press, 1992

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**Concrete**

General qualities & testing

**Steel**

General characteristics / manufacturing process (video)

**Glass**

General characteristics / manufacturing process (video)

Product forms (laminated glass video)

These development segments provided for the development of clickable text (similar to hyper-text in "Mosaic") found in the "Historic Origins" segment of "Masonry" as well as animations, time sensitive text highlighting (found in "failures" in "light wood framing") in the "Wood" segment,

and video clip importing found in the "Glass" and "Steel" introductory segments.

The development of image scanning standards, an electronic catalog of scanned images, standards for interface, emphasis, and references have occupied most of the project development to date. The next priorities include the resumption of image scanning, page making, and the beginning of the editing and review cycle.

At the annual meeting, the authors are prepared to show, with the use of a Macintosh Powerbook and digital overhead projection unit, segments of this tutorial. How the course was designed and executed, will be discussed as well as, the supporting software used.