ARCHITECTS, HOSPITALS AND EARTHQUAKES

SOME ISSUES

• THE COMPLEXITY OF HOSPITALS
• WHAT THE ARCHITECT WORRIES ABOUT
• THE NONSTRUCTURAL PROBLEM
ARCHITECTS, HOSPITALS AND EARTHQUAKES

SOME ISSUES.........................................................

COMPLEXITY

a large modern hospital is…
A very upscale residential hotel...
A highly serviced office building (record keeping) ...
An industrial building (materials processing and distribution, laundry)...
A high-tech laboratory...
A hazardous materials usage and storage facility...
A restaurant...

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SOME ISSUES

COMPLEXITY

THE HOSPITAL
ARCHITECTS
BIBLE:
the AIA guidelines

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MCEER 2005 ANNUAL MEETING SACRAMENTO CA FEBRUARY 25 2005
SOME ISSUES………………………………….

A typical general hospital has about 26 different units, each with its own spatial, environmental and service requirements, each is related to other units, and each has specific vertical and horizontal planning requirements for access by medical, administrative and service staff, visitors and patients.
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SOME ISSUES

WORRIES

Planning, function, costs, the physicians, the administration... but not seismic, because

• the seismic problem is highly regulated and codified, and can be delegated to the engineer.

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SOME ISSUES.........................................................

The AIA guidelines (177 pages) devotes 0.50 pages to the seismic problem:

• ref. to relevant codes, special design of essential systems
• ref. special inspection during construction
• ref. to seismic design for elevators
• ref. to importance factors
• ref. to importance factors for relocatable units
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SOME ISSUES

THE NONSTRUCTURAL PROBLEM

Modern hospitals in recent earthquakes have been forced to evacuated patients because of isolated failures in nonstructural components even in well designed and constructed facilities in California.
This rupture in sprinkler pipe occurred where the drop connected to the lateral run. Elsewhere small-diameter copper piping broke at connections to anchored equipment.
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SOME ISSUES

Holy Cross Medical Center, Mission Hills
replacement hospital, post-1973

Damage to fan units, ducts and booster pumps in penthouse caused loss of HVAC to entire facility. Also power failure for six hours (one death)

Temporary closure of facility due to HVAC loss, fullservice s only after 3 1/2 weeks

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SOME ISSUES………………………………………………

“.the Hospital Act was very effective in limiting structural damage: to a lesser extent the Act was also effective in controlling nonstructural damage. The fact that two of the largest and newest facilities in the San Fernando Valley were effectively shut down for the week of the earthquake by nonstructural damage is troubling and raises issues about whether the Act’s aim to provide functional hospitals has been met”.

CA State Seismic Safety Commission

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SOME ISSUES

• Hospital construction in California (including nonstructural) is well regulated and inspected

• Building industry is not capable of constructing fail-safe facilities under current methods and budgets

• Elsewhere in the country standards are lower, and there are large issues as to roles and responsibilities for nonstructural design, approval and installation

• Field Act shows that key to good seismic performance is knowledgeable plan checking and inspection, but hospitals much more complex than schools

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