The History of Structural Masonry Standards

1973 1985 2017
Octagonal Test Fixture

<table>
<thead>
<tr>
<th>Structural Element</th>
<th>Failure</th>
<th>Approximate Incident Blast Overpressure (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass windows, large and small.</td>
<td>Shattering usually, occasional frame failure.</td>
<td>0.5–1.0</td>
</tr>
<tr>
<td>Corrugated asbestos siding.</td>
<td>Shattering.</td>
<td>1.0–2.0</td>
</tr>
<tr>
<td>Corrugated steel or aluminum paneling.</td>
<td>Connection failure followed by buckling.</td>
<td>1.0–2.0</td>
</tr>
<tr>
<td>Wood siding panels, standard house construction.</td>
<td>Usually failure occurs at the main connections allowing a whole panel to be blown in.</td>
<td>1.0–2.0</td>
</tr>
<tr>
<td>Concrete or cinder-block wall panels 8 in. or 12 in. thick (not reinforced).</td>
<td>Shattering of the wall.</td>
<td>2.0–3.0</td>
</tr>
<tr>
<td>Brick Wall panel, 8 in. or 12 in. thick (not reinforced).</td>
<td>Shearing and flexure failures.</td>
<td>7.0–8.0</td>
</tr>
</tbody>
</table>
James E. Amrhein

1972
MASONRY TECHNOLOGY ADVANCING

James E. Amrhein
1972
WESTERN STATES CLAY PRODUCTS ASSOCIATION

Technical Committee
4” Brick House 1974
ONE-AND-TWO-STORY RESIDENTIAL REINFORCED
4-INCH HOLLOW CLAY BRICK CONSTRUCTION
WESTERN STATES CLAY PRODUCTS ASSOCIATION
2550 BEVERLY BOULEVARD
LOS ANGELES, CALIFORNIA 90057

1. Subject: One- and two-story residential reinforced 4-inch hollow clay brick construction.

Recommendation:

1. Foundations, footings and basement walls shall be of the standard building code and the particular job site for typical detail.

2. Four-inch Hollow Clay Brick Wall Construction. The 4-inch hollow clay brick construction shall conform to the requirements of the building code for reinforced masonry except as specifically mentioned in this section. At the time of laying,

Recommendation:

1. Recommendation: That the One- and Two-Story Residential Reinforced 4-inch Hollow Clay Brick Construction is an alternate Recommendation: That the One- and Two-Story Residential Reinforced 4-inch Hollow Clay Brick Construction is an alternate to the standard building code as provided in the design and construction manual with the report and the attached Figures No. 1 through 5.

This recommendation is subject to annual re-examination.
MASONRY TECHNOLOGY ADVANCING

Don Wakefield
1978
MASONRY TECHNOLOGY ADVANCING

Walt L. Dickey
1980
MASONRY CODES LAGGING

Uniform Building Code

BOCA National Building Code

Standard Building Code
Mel Mark was the person who wrote chapter 12 of the ATC document.
MASONRY – TWO WORLDS

- Reinforced Masonry
- Traditional Masonry
- Seismic
PROBLEMS WITH THE 1976 UBC

0.33f_m' but not to exceed 900 psi
0.167f_m' but not to exceed 450 psi

Definitions
H/T Limits
Stack Bond
Dimensions
Unity Equation
Very High Factors of Safety
Construction
Quality Control
THE MISSING ORGANIZATION

Masonry

Manufactures
- BIA
- NCMA
- PCA
- NLA
- WSCPA

Designers
- ACI
- ASCE
- ?

Contractors
- MCAA

Labor
- BAC
- IMI
- MIA - LA

Many Others
WSCPA – FILL THE HOLE

Hilton Hotel SF Airport 1975

WSCPA Technical Committee
Dick Wasson - Chair, Don Wakefield, Jim Amhrein, Walt Dickey, John Tawresey
TMS FORMATION

Sandy Sandoval was the executive director of the Colorado Masonry Institute.

Dietz Lusk was the first executive director of TMS, appointed by Sandy Sandoval to organize TMS and get it incorporated.

Paul Lenchuk was executive director of NCMA and was dead set against TMS as a result of the 10 Mission Objectives.

Sandy Sandoval becomes first executive director.

John Heslip followed Lenchuk as executive director of NCMA. He believed in the TMS concept and was very helpful in moving the organization forward to a national organization.

Ray Lackey, IMI, donated $8000 to TMS to start the TMS Journal.
THE FIRST STANDARD

THE MASONRY SOCIETY

STANDARD BUILDING CODE REQUIREMENTS FOR MASONRY CONSTRUCTION

AUGUST, 1981

TMS Document No. 401-81

COMMITTEE MEMBERS

Donald A. Wakefield, P.E., Chairman
J. Gregg Borchelt, P.E., Secretary

James E. Amrhein, P.E.
D. B. Anderson, P.E.
Bill Bailey, P.E.
J. Dan Berich
Walter L. Dickey, P.E.
George C. Hanson, P.E.

Robert Helfrich, P.E.
Clar Monk, P.E.
James L. Noland, P.E.
Don T. Pyle, P.E.
Gene Salveson
John G. Tawresey, P.E.

TMS Document No. 401-81
Jim Noland

“This is a great moment. This is our opportunity to be arbitrary, for in the future if someone wants to change this provision it will have to be justified”
TMS 401- 81 ADOPTION BY UBC


TMS review and responds to comments [big job]. Publishes results TMS 401-81

1982 Structural Engineers of California ad hoc review committee.

July 1983 three day joint industry line-by-line review.

August 1983 TMS sponsored three day line-by-line review.

October 1983 TMS 401-81 given to the Structural Engineers of Arizona, Oregon and Washington for review.

November 1983 TMS 401-81 presented to SEOC and others.

March 1984 masonry industry groups and structural engineers met with TMS for two days to resolve final issues.

September 1984 the International Conference of Building Officials 850 members voted to replace Chapter 24 of the UBC with TMS 401-81 There were no negative votes
Definitions
H/T Limits
Stack Bond
Dimensions
Unity Equation Alternative
Reasonable Factors of Safety
UBC CHAPTER 24 AND ACI/ASCE 530

Manufactures

Designers

Contractors

Labor

Masonry

The Masonry Society

BIA NCMA PCA NLA WSCPA ACI ASCE MCAA IMI MIA - LA BAC
MASONRY CODES COMPETING

Uniform Building Code
Chapter 24
TMS 402

ASCE/ACI 530
MASONRY CODE COMPROMISE

Masonry Standards Joint Committee
MSJC
Frustrations with the MSJC

- Required the Committee to follow 3 sets of rules, which slowed things down, sometimes created conflicts, and often frustrated

- Sounds minor, but it was a pain for everyone to know what to call it. Most used ACI 530, some used MSJC, a few ASCE 5, and fewer TMS 402. Most thought it an ACI standard. This was a bigger issue than many thought because...

- The result was ACI received most of the orders, thus most of the revenue, while TMS received most of the questions about the standards, and had trouble financially
The transition starts...

- In the late 1990's, early 2000's some pushed for sole sponsorship by TMS. Not well received by ACI and ASCE. But it got people thinking & meetings were held.

- In 2002, a Memorandum of Understanding (MOU) was signed by ACI, ASCE and TMS outlining the goal for TMS to serve as the lead sponsor of the MSJC, but...
  - Clearly stated that the Committee was to remain joint.
  - TMS could not become the lead sponsor until becoming an ANSI SDO (accredited Standards Developing Organization).
The transition continues…

- As a result, TMS submitted application to ANSI in 2003
- TMS accepted as an ANSI SDO in 2004!
- TMS becomes lead sponsor of MSJC in 2006 after a revision to the MOU

TMS 402-08/ACI 503-08/ASCE 5-08
TMS 602-08/ACI 530.1-08/ASCE 6-08
Things Getting Better for MSJC, but not TMS

- While having TMS serve as a lead sponsor helped streamline things for the MSJC, it added to TMS's workload, while most still considered the standard ACI 530.

- Cost sharing with ACI and ASCE helped, but TMS wanted a "flagship" publication like ACI 318 and ASCE 7 for ACI and ASCE respectively.

- More discussions, and pushing by some for sole sponsorship.
The Push to Sole Sponsorship

- Some (including The Hammer) wanted to see TMS in control of the standard to be recognized for the good work it was doing
- At the "urging" (ok, in some cases pushing) of some, more discussions and meetings were held
- Discussions included thoughts on a "buy-out" arrangement
- Eventually after many discussions, ACI and ASCE generously relinquished their rights to the standards in 2013
- TMS now the sole sponsor!
MISSION ACCOMPLISHED

- The Results
  - TMS recognized as a major standards developer
  - TMS respect and recognition growing as hoped
  - TMS revenues from sales has already increased, while sales to and by ACI and ASCE remain strong
  - Designers and contractors now clear on who develops the masonry standards, where to get help, and where to go to propose changes/revisions
Masonry Codes & Standards
Thank You!

- Questions?