HYBRID PRECAST WALL SYSTEMS
FOR SEISMIC REGIONS

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Draft Industry Meeting Resolutions

Meeting Date: July 16, 2008
Meeting Venue: Phone-Conference
In Attendance: N. Hawkins, Y. Kurama, B. Smith

The following resolutions have been made based on the meeting:

Test Specimen Design

- The prior resolution that the wall will be designed for the maximum drift angle required by ACI ITG 5.2 (considered to be the MCE-level drift angle), with only limited additional lateral displacement capacity incorporated into the design was reviewed and approved.
- A small amount of gap opening will be allowed to occur at the joint above the base panel. To limit the size of this gap opening, one #3-rebar will be located at each end of the wall and spanning across the joint. The stress in this reinforcement will be limited to approximately 50% of the yield stress, f_y. The energy dissipating reinforcement used at the wall base will be terminated within the base panel and prior to crossing into the upper panel.
- Horizontal reinforcement with 90-degree end hooks will be provided at the bottom of the base wall panel to prevent vertical splitting failure in the panel due to the gap opening at the foundation joint. This reinforcement is in addition to the wire mesh reinforcement in the wall panel and will be designed to resist 6000 lbs per horizontal foot of the panel, which is the minimum amount required by ACI ITG 5.2.
- Since no significant gap opening is expected at the joint above the base panel, horizontal reinforcement will not be designed at the top of the base panel or at the bottom of the upper panel.
- All energy dissipating reinforcement will be ASTM-A706 steel since the strain capacity of this steel (strain at peak tensile stress, f_u) is relatively large – approximately 14% for #6-rebar under monotonic loading. All other mild steel reinforcement used in the structure will be ASTM-A615 steel.
- Since the energy dissipating steel in the test specimen is designed using relatively small #6-rebar, the additional debonded length in this reinforcement (due to bond deterioration during the cyclic displacements of the structure) at the MCE-level drift is expected to be small. Therefore, when designing the debonded length, the coefficient α_b in Equation 5.6.3.2 of ACI ITG 5.2 shall be taken as the smaller limit of 2.0.

This project is funded by the Charles Pankow Foundation and the Precast/Prestressed Concrete Institute. Any opinions, findings, conclusions, and/or recommendations expressed in this material are those of the researchers and do not necessarily represent the views of the sponsors.

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- Considering cyclic loading conditions, a slightly conservative (larger) debonded length will be used to prevent premature fracture of the energy dissipating reinforcement before the MCE-level drift is reached. For this purpose, the debonded length of the reinforcement will be determined to limit the MCE-level strain in the bars to about 70% of the expected monotonic strain capacity of the steel at peak stress rather than 85% of the strain capacity as allowed by ACI ITG 5.2.
- Buckling of the energy dissipating reinforcement will be prevented by the surrounding panel concrete since the spalling of the concrete at the location of the bars is not expected. The bars will be in full contact with the surrounding concrete and only a thin layer of wrapping material will be used for debonding. Buckling of the unsupported length of the bars within the gap opening is not expected since the unsupported length over bar diameter ratio (approximately equal to 1.29 at the MCE-level) is small.

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