



MASONRY INSIGHTS

Masonry checklist: reviewing structural plans

The checklist below is intended to serve as a starting point for your design and review efforts as you develop masonry designs and details. Please customize this checklist as required to meet the needs of your specific projects.

- f'm (masonry assembly strength) is 2,000 psi or greater
 - ideally in Midwest it should be 2,500 psi
 - strengths between 2,000 and 4,000 psi are permitted in current codes¹
- check that all components of masonry are specified
 - block strength (check www.forsei.com/cmudata to verify based on project location)
 - mortar type (mortar strength need not be listed)
 - recommend Type S for structural walls
 - recommend Type N for non-structural walls (veneer and partition walls)
 - grout strength
 - should be at least 2,000 psi ⁶, and equal to or greater than f'm
- check that control joints (CJ) are located on plans
 - CJ's in reinforced structural walls
 - at common wall locations ²: generally at 25 ft spacing or less, change of wall height, building corners
 - at a distance (recommend 2 ft minimum) away from opening edges ³ - not at opening edges
 - CJ's in unreinforced non-structural masonry walls
 - at common wall locations ²
 - at opening edges ⁴

- CJ not needed when sufficient horizontal reinforcement ⁵ is provided
- review masonry general notes
 - minimize 'catch-all' statements for reinforcement requirements in general notes such as 'Provide reinforcement in all masonry walls at maximum 48" o.c. spacing'. Consider providing schedules for wall and lintel reinforcement.
 - do specified lap lengths account for bar sizes, bar spacing, and different cover conditions? Consider specifying lap lengths within masonry wall and lintel schedules.
 - verify control joint spacing is not specified in general notes, but rather located specifically on plan to ensure joints do not impact structural design of shear walls, piers, etc.
- review non-load bearing partition walls
 - ensure top of partition wall connection details prevent unintended transfer of gravity or shear loads to the wall
 - verify if bond beams are required at non-load bearing partition walls
- review lintels, and prefer masonry lintels
 - masonry lintels are considered first for ALL openings
 - openings 8" or less do not need a lintel
 - openings 4'-0" or less could be a single-course masonry lintel with minimal reinforcement, and jamb could be one cell with common wall reinforcement
 - openings more than 4'-0"
 - consider a masonry lintel as the first option
 - consider multi-course masonry lintels
 - consider stirrups in masonry lintels when deeper lintels are not possible
 - consider a prefabricated masonry lintel (contractor option)
 - consider the following for steel lintels:
 - vertical reinforcement location - generally needs to move one of more cells away from opening due to conflict with the steel lintel to masonry wall connection
 - torsional effects - especially with steel wide flanges with virtually no torsional capacity or top flange end restraint
 - ensure bearing plate size is compatible with block shapes used

- thermal bridging - architectural challenge with building insulation envelope
- thermal bridging - structural challenge with differential thermal movement between steel and masonry
 - differential movement between steel and masonry, even after building is insulated and occupied, will cause very large forces and potential cracking unless steel is allowed to move relative to masonry
 - one method for accommodating thermal movement is to use control joints at one or both ends of the steel lintel, which reduces wall and lintel effectiveness, but is necessary for differentially moving materials
 - are slotted holes provided for in the steel flange to masonry wall bearing connection to allow for differential movement?
- consider the masonry soaps (thin masonry shells) used to cover the steel
 - are they able to be cut to fit the steel section (or steel section and bottom plate)?
 - are they sufficiently durable to building use conditions?
 - no connections are allowed on masonry soaps
- review bearing plate details
 - masonry bearing plates should not conflict with the masonry face shell in most cases
 - in no case should the masonry bearing plates be exposed (plate should never extend to the face of masonry)
- conflicts between steel columns and masonry
 - does steel column fit within masonry wall?
 - was a masonry pier considered?
 - consider the masonry remaining to cover the steel
 - is the masonry required to be cut to fit around the steel section
 - is remaining masonry sufficiently durable to building use conditions?
 - no connections are allowed on thin masonry
 - consider a CJ at these locations of steel columns used within masonry
- steel section should not be encased in grout within masonry, gap should be provided

REFERENCES

- ¹ - current masonry code is TMS 602-16
- ² - based on NCMA TEK 10-2C (2010) or TEK 10-3
- ³ - based on NCMA TEK 10-2C (2010), Figure 2c or Figure 2d (page 3)
- ⁴ - based on NCMA TEK 10-2C (2010), Figure 2a or Figure 2b (page 3)
- ⁵ - based on NCMA TEK 10-3
- ⁶ - based on ASTM C476 as referenced in TMS 602-13 Specification Section 2.2