

GENERAL NOTES

ARCHITECTURAL CLADDING (DESIGN-BUILD)

1. ALL ARCHITECTURAL CLADDING, INCLUDING METAL STUD WALLS, CURTAIN WALLS, WINDOW WALLS, AND STOREFRONTS, SHALL BE DESIGN-BUILD BY CONTRACTOR. ARCHITECTURAL CLADDING SYSTEMS ARE NOT SPECIFIED ON THE STRUCTURAL DRAWINGS AND DO NOT FORM A PART OF THE PRIMARY STRUCTURAL SYSTEM. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR ALL INFORMATION PERTAINING TO ARCHITECTURAL CLADDING SYSTEMS.
2. CONTRACT DOCUMENTS INDICATE DESIGN INTENT, INCLUDING GENERAL ARRANGEMENT, EXPECTED PROFILES, AND SUPPORT POINTS. INDICATIONS OF SPECIFIC CLADDING ELEMENTS AND THEIR CONNECTIONS TO STRUCTURE, WHERE SHOWN, ARE INTENDED SOLELY TO SHOW INTENDED LOAD PATH AND SUPPORT POINTS. WHERE THE INDICATED SUPPORT POINTS ARE NOT ADEQUATE, PROVIDE ADDITIONAL SUPPORTS, CONNECTIONS, BRACES OR OTHER ELEMENTS AS REQUIRED AT NO ADDITIONAL COST TO OWNER. ADVISE ARCHITECT (STRUCTURAL ENGINEER) OF ANY CHANGES THAT AFFECT THE DESIGN INTENT, SUCH AS CLADDING PROFILE OR INTENDED LOAD PATH, PRIOR TO DEVELOPING SHOP DRAWINGS FOR THE WORK.
3. DESIGN CLADDING MEMBERS, CONNECTIONS, AND SUPPORTS TO STRUCTURE FOR ALL LOADS, FIRE RESISTIVE REQUIREMENTS, AND OTHER CONDITIONS OF GOVERNING CODE AND CONTRACT DOCUMENTS.
4. DESIGN CLADDING MEMBERS, CONNECTIONS, AND SUPPORTS TO STRUCTURE TO ALLOW FOR ADEQUATE THERMAL EXPANSION AND CONTRACTION, AND PROVIDE ALLOWANCE FOR DIFFERENTIAL GRAVITY AND SEISMIC DEFORMATIONS BETWEEN SUPPORTING STRUCTURE AND CLADDING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND GOVERNING CODE. WHERE STRUCTURAL DEFORMATIONS ARE NOT SHOWN, ASSUME THE FOLLOWING VALUES FOR BID PURPOSES, AND OBTAIN ACCURATE ESTIMATE FROM ARCHITECT (STRUCTURAL ENGINEER) PRIOR TO DESIGN:
- A. STORY DRIFT: DELTA (Δ) = 2.5% OF STORY HEIGHT
B. LIVE LOAD + SUPERIMPOSED DEAD LOAD VERTICAL DEFLECTION = 3/4 INCH.
5. SUBMIT SHOP DRAWINGS AND STRUCTURAL CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL CIVIL OR STRUCTURAL ENGINEER, LICENSED IN THE STATE OF CALIFORNIA, TO ARCHITECT (STRUCTURAL ENGINEER) FOR REVIEW AND GOVERNING CODE AUTHORITY FOR APPROVAL.
6. CONNECTIONS TO STRUCTURE SHALL NOT IMPOSE ECCENTRIC OR TWISTING LOADS ON STRUCTURAL SUPPORT MEMBERS. WHERE ECCENTRIC CONNECTIONS ARE NECESSARY, PROVIDE ADDITIONAL BRACES, STIFFENER PLATES, OR OTHER SUPPORTS TO STABILIZE STRUCTURAL MEMBERS AT NO ADDITIONAL COST TO OWNER.

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS INSTALLED IN NORMAL WEIGHT OR LIGHTWEIGHT CAST-IN-PLACE CONCRETE SHALL BE AS FOLLOWS:
- A. KWIK BOLT TZ EXPANSION ANCHORS (ICC-ES REPORT ESR-1917) AS MANUFACTURED BY HILTI, INC.
B. HIT-RE 500-SD ADHESIVE ANCHORS (ICC-ES REPORT ESR-2322) AS MANUFACTURED BY HILTI, INC. (NORMAL WEIGHT CONCRETE ONLY).
2. POST-INSTALLED ANCHORS INSTALLED IN NORMAL WEIGHT OR LIGHTWEIGHT CAST-ON-METAL DECK CONCRETE SHALL BE AS FOLLOWS:
- A. INSTALLED ON UNDERSIDE OF DECK: KWIK BOLT TZ EXPANSION ANCHORS (ICC-ES REPORT ESR-1917) AS MANUFACTURED BY HILTI, INC.
B. INSTALLED ON TOP SIDE OF DECK HAVING A MINIMUM CONCRETE THICKNESS OF 3-1/4 INCH OVER TOP OF DECK: KWIK BOLT TZ EXPANSION ANCHORS (ICC-ES REPORT ESR-1917) AS MANUFACTURED BY HILTI, INC.
3. POST-INSTALLED ANCHORS INSTALLED IN FULLY GROUTED CONCRETE MASONRY UNITS SHALL BE AS FOLLOWS:
- A. KWIK BOLT 3 EXPANSION ANCHORS (ICC-ES REPORT ESR-1389) AS MANUFACTURED BY HILTI, INC.
B. HIT-HY 150 MAX ADHESIVE ANCHORS (ICC-ES REPORT ESR-1967) AS MANUFACTURED BY HILTI, INC.
4. POST-INSTALLED ANCHORS INSTALLED IN UNREINFORCED BRICK (13-INCH MIN THICKNESS) SHALL BE AS FOLLOWS:
- A. HIT-HY-20 ADHESIVE ANCHORS WITH SCREEN TUBE (ICC-ES REPORT ESR-2659) AS MANUFACTURED BY HILTI, INC.
5. POST-INSTALLED ANCHORS OF EQUAL QUALITY AND WITH CURRENT ICC-ES REPORT MAY BE SUBSTITUTED IF APPROVED BY THE ARCHITECT (STRUCTURAL ENGINEER).
6. POST-INSTALLED ANCHORS INSTALLED IN EXTERIOR EXPOSURE OR DAMP ENVIRONMENT SHALL BE STAINLESS STEEL.
7. DOWELS ANCHORED IN CONCRETE, CONCRETE MASONRY UNITS (GROUTED OR HOLLOW), OR BRICK SHALL BE AS FOLLOWS. DOWELS INSTALLED IN EXTERIOR EXPOSURE OR DAMP ENVIRONMENT SHALL BE STAINLESS STEEL. LENGTHS SHALL BE AS INDICATED ON DRAWINGS.
- A. DEFORMED REINFORCING BARS: ASTM A615, GRADE 60, OR ASTM A706.
B. CARBON STEEL THREADED STEEL RODS: ASTM A36.
C. STAINLESS STEEL THREADED RODS: ASTM F593, ALLOY GROUP I, TYPE 304, CONDITION CW.

8. INSTALL POST-INSTALLED ANCHORS IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REINFORCING STEEL DOWELS, THREADED RODS, AND ANCHORS SHALL BE FREE OF DUST, GREASE, RUST AND OTHER MATERIALS THAT WILL IMPAIR BOND WITH CONCRETE.
9. USE ONLY NON-REBAR CUTTING DRILL BITS TO DRILL HOLES IN CONCRETE AND CONCRETE MASONRY UNITS. EXISTING REINFORCING STEEL SHALL BE POSITIVELY LOCATED BY NON-DESTRUCTIVE MEANS PRIOR TO DRILLING HOLES. DO NOT CUT OR DAMAGE EXISTING REINFORCING STEEL UNLESS APPROVED BY THE ARCHITECT (STRUCTURAL ENGINEER).
10. WHERE EXISTING CONCRETE IS DAMAGED AND/OR DRILLED HOLES ABANDONED, THE DAMAGED CONCRETE OR ABANDONED HOLES SHALL BE REPAIRED OR FILLED WITH NON-SHRINK GROUT, RESPECTIVELY. BRING EACH CONDITION TO THE ATTENTION OF THE ARCHITECT (STRUCTURAL ENGINEER) PRIOR TO IMPLEMENTING REPAIRS.
11. DO NOT DRILL HOLES WITHIN 4 INCHES OF EXISTING ELECTRICAL OUTLETS THAT ARE EMBEDDED IN SUBSTRATE.
12. BRING TO THE ATTENTION OF THE ARCHITECT (STRUCTURAL ENGINEER) ANY POST-INSTALLED ANCHOR LOCATION THAT CANNOT COMPLY WITH THE PARAMETERS STATED HEREIN AND INDICATED ON THE DRAWINGS.

METAL DECKING

1. METAL DECKING SHALL BE OF GAGE AND PROFILE AS INDICATED ON THE DRAWINGS, BY MANUFACTURER(S) SPECIFIED.
2. METAL DECKING AND ACCESSORIES SHALL BE COLD FORMED FROM GALVANIZED STEEL SHEETS COMPLYING WITH ASTM A653-S5 GRADE 33 (MINIMUM), HAVING A MINIMUM YIELD STRENGTH OF 38,000 PSI, WITH COATING DESIGNATION G60. GALVANIZING SHALL BE BY THE HOT-DIP PROCESS COMPLYING WITH ASTM A924.
3. MINIMUM BEARING METAL DECKING ON SUPPORTS SHALL BE 2 INCHES. ATTACH METAL DECKING TO SUPPORTING STEEL MEMBERS BY WELDING AS SPECIFIED ON THE DRAWINGS AND AS RECOMMENDED BY DECK MANUFACTURER USING E70 ELECTRODES. DECK WELDING SHALL BE IN COMPLIANCE WITH ANSI/AISC D1.1. WELDERS SHALL BE AWS CERTIFIED AS REQUIRED BY THE GOVERNING CODE AUTHORITY.
4. DECKING IS DESIGNED FOR UNSHORED CONSTRUCTION TO MAXIMUM SPANS INDICATED ON THE DRAWINGS. SUBJECT TO APPROVAL BY THE ARCHITECT (STRUCTURAL ENGINEER), PROVIDE ADEQUATE SHORING OR HEAVIER GAUGE DECK WHERE MAXIMUM SPANS ARE EXCEEDED. DECKING SHALL BE CONTINUOUS OVER THREE SPANS WHERE POSSIBLE.
5. HOURLY FIRE RESISTIVE REQUIREMENTS FOR FLOOR AND ROOF DECKS SHALL BE DETERMINED USING CBC TABLE 601, BUILDING TYPES OF CONSTRUCTION AND FIREPROOFING MATERIALS ARE AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
6. COMPOSITE SLABS OF CONCRETE ON STEEL DECK SHALL BE CONSTRUCTED IN ACCORDANCE WITH CBC SECTIONS 1804.3.3 AND 2209.2.
- A. PROVIDE VENTED DECKING WHERE VAPOR-IMPERVIOUS MEMBRANE OCCURS OVER CONCRETE SLAB-ON-DECK.
B. FOR COMPOSITE DECKING, DECKING WITH EMBOSSEMENTS TO FORM A MECHANICAL LOCK BETWEEN CONCRETE AND DECKING.
C. SHEAR STUDS SHALL BE NELSON SHEAR CONNECTOR STUDS (ICC EVALUATION SERVICE REPORT ER-2856), OR AN APPROVED EQUAL, AND SHALL BE MADE FROM COLD DRAWN, LOW CARBON STEEL CONFORMING TO ASTM A108, GRADES C1010 THROUGH C1020, WITH A MINIMUM TENSILE STRENGTH OF 65 KSI. STUD WELDING TEST AND INSPECTION SHALL CONFORM TO AWS D1.1, CHAPTER 7.
1) PROVIDE SHEAR STUDS FASTENED TO ALL FLOOR BEAMS AND GIRDEES AS SHOWN ON DRAWINGS OR AT MAXIMUM SPACING INDICATED.
2) WELD SHEAR STUDS TO CONCRETE WITH AWS D1.1, CHAPTER 7, WELDERS SHALL BE AWS CERTIFIED AS REQUIRED BY THE GOVERNING CODE AUTHORITY. FASTEN WITH AN AUTOMATIC ELECTRIC ARC WELD GUN. REPAIR DEFECTIVE STUDS PER AWS D1.1 SECTION 7.7.5.
3) 18-GAUGE DECKING WITH A MINIMUM TENSILE STRENGTH OF 65 KSI. WELDED SHEAR STUDS ARE ATTACHED THROUGH THE DECK TO SUPPORTS.
D. PIPES UP TO 4" DIAMETER (200 LBS MAX PER HANGER), DUCTWORK UP TO 80" X 16" OR EQUIVALENT PERIMETER (200 LBS MAX PER HANGER), AND CEILINGS MAY BE HUNG FROM METAL DECKING WITH STRUCTURAL CONCRETE TOPPING. SUCH HANGERS SHALL BE INSTALLED IN CONCRETE TOPPING USING ANCHORAGE SYSTEMS HAVING CURRENT ICC-ES REPORTS. HEAVIER LOADS SHALL BE SUPPORTED BY STRUCTURAL FRAMING OR SUPPLEMENTAL SECONDARY FRAMING.
E. PROVIDE CLOSURE ANGLES AT ALL OPENINGS IN CONCRETE SLAB-ON-DECK, INCLUDING THOSE NOT SHOWN ON STRUCTURAL DRAWINGS. CLOSURE ANGLES SHALL BE 18-GAUGE MINIMUM AND SHALL BE WELDED TO DECKING OR SUPPORTS, UNLESS DETAILED OTHERWISE.
F. SCORED CONCRETE ON UNDERSIDE OF METAL DECKING MAINTAINING CONCRETE THICKNESS AS INDICATED ON DRAWINGS.

ROOF DECKING:

7. A. FOR COMPOSITE CONCRETE ON METAL ROOF DECKING, REFER TO FLOOR DECKING REQUIREMENTS HEREIN ABOVE.
B. FOR INSULATING CONCRETE FILL ON METAL ROOF DECKING:
1) USE ROOF DECK WITH FACTORY PUNCHED VENT TABS PROVIDING 1 TO 1.5 PERCENT OPENING FOR POSITIVE VENTING.
2) PROVIDE INSULATING CONCRETE, WITH OR WITHOUT INSULATION BOARD, AS SPECIFIED ON DRAWINGS. AGGREGATE SHALL COMPLY WITH ASTM C332, GROUP 1. PORTLAND CEMENT SHALL COMPLY WITH ASTM C150, TYPE I OR TYPE II. OVER DRY UNIT WEIGHT OF INSULATING CONCRETE SHALL BE 25 TO 30 PCF WITH A MINIMUM COMPRESSIVE STRENGTH OF 140 PSI, TESTED IN ACCORDANCE TO ASTM C495.
3) REINFORCE WITH 2-INCH HEXAGONAL MESH WOVEN FROM NO. 19 GAGE GALVANIZED WIRE WITH AN ADDITIONAL NO. 16 GAGE GALVANIZED WIRE WOVEN INTO THE MESH AT 3' 1/2". THE MESH SHALL BE PULLED UP TO APPROXIMATELY 1/2 INCH BELOW THE SURFACE AFTER FINAL SCORING.
C. FOR METAL DECK ONLY OR METAL DECK WITH INSULATING CONCRETE FILL:
1) DO NOT SUSPEND PIPING OVER 1-1/2" DIAMETER, DUCTS LARGER THAN 12" X 16" (OR EQUIVALENT PERIMETER), OR OTHER LOADS WITH EXCEPTION OF SUSPENDED ACOUSTICAL CEILINGS AND INTEGRALLY SUPPORTED LIGHT FIXTURES FROM ROOF DECKING. HANGERS TO ROOF DECKING SHALL PENETRATE DECK AND BE ATTACHED TO A 1/2" DIAMETER BY 1'-0" LONG RODS LAID IN AND PARALLEL TO THE BOTTOM OF THE LOW DECK FLUTES. HANGERS SHALL BE TWO FLUTES APART IF THEY OCCUR ON THE SAME SPAN.

8. AT COMPLETION OF METAL DECK ERECTION, ALL WELDS IN EXPOSED AREAS SHALL BE DE-SLAGGED, CLEAND AND PRIMED WITH A ZINC RICH PRIMER.
9. SUBMIT COMPLETE METAL DECKING SHOP DRAWINGS TO ARCHITECT (STRUCTURAL ENGINEER) FOR REVIEW PRIOR TO FABRICATION.

NON-BEARING METAL STUDS (DESIGN-BUILD)

1. NON-BEARING METAL STUDS ARE NOT SPECIFIED IN THE STRUCTURAL DRAWINGS AND DO NOT FORM A PART OF THE PRIMARY STRUCTURAL SYSTEM. FOR CONFIGURATION OF NON-LOAD BEARING METAL STUD SYSTEMS, REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS. COORDINATE METAL STUD FRAMING WITH STRUCTURAL DRAWINGS, WHICH MAY INDICATE THE INTENT FOR ATTACHMENT OF CERTAIN METAL STUDS TO THE PRIMARY STRUCTURE.
2. SEE ARCHITECTURAL CLADDING NOTES WHERE METAL STUDS FORM A PART OF THE ARCHITECTURAL CLADDING SYSTEM.
3. NON-LOAD BEARING METAL STUD SYSTEMS SHALL BE DESIGNED BY A PROFESSIONAL CIVIL OR STRUCTURAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA IN ACCORDANCE TO CBC SECTIONS 2209 AND 2210, AMERICAN IRON AND STEEL INSTITUTE (AISI) "NORTH AMERICAN SPECIFICATIONS FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" (S100), AND AISI "STANDARD FOR COLD-FORMED STEEL FRAMING - GENERAL PROVISIONS" (S200).
4. NON-LOAD BEARING METAL STUDS, TRACKS, COMPONENTS, AND ACCESSORIES SHALL BE MANUFACTURED BY CURRENT MEMBERS OF THE STEEL STUD MANUFACTURERS ASSOCIATION (ICC-ES REPORT ER-4943P) AND FORMED FROM GALVANIZED STEEL SHEETS CONFORMING TO ASTM A653-S5 OR ASTM A1003 (TYPE I), GRADE 33 (MINIMUM). GALVANIZING SHALL BE BY THE HOT-DIP PROCESS COMPLYING WITH COATING DESIGNATION G60.
5. DESIGN METAL STUD SYSTEMS TO ACCOMMODATE 1" DIFFERENTIAL VERTICAL DEFLECTION BETWEEN FLOORS (ROOF) AT INTERIOR PARTITIONS.

STRUCTURAL STEEL (CONTINUED)

14. WELDS SHALL BE PREQUALIFIED PER AWS D1.1/D1.1M. NON-PREQUALIFIED WELDED JOINTS SHALL BE QUALIFIED BY TEST PER AWS D1.1/D1.1M.
15. SUBMIT TO ARCHITECT (STRUCTURAL ENGINEER) FOR REVIEW A WRITTEN WELDING PROCEDURE SPECIFICATION (WPS) FOR ALL WELDS USED ON PROJECT PRIOR TO FABRICATION. FOR WELDS NOT PREQUALIFIED, THE SUPPORTING PROCEDURE QUALIFICATION RECORD (PQR) SHALL ALSO BE SUBMITTED WITH THE WPS. WPS SHALL BE IN ACCORDANCE TO AWS D1.1/D1.1M, SECTION 4.8 AND SHALL INCLUDE THE FOLLOWING INFORMATION FOR EACH WELD TYPE AND POSITION:
- A. SKETCH OF JOINT DESCRIBING GEOMETRY AND APPLICABLE DIMENSIONS, WELD TYPE AND SIZE, SEQUENCE OF WELD DEPOSITION, AND MAXIMUM LAYER THICKNESS AND BEAD WIDTHS. LAYER THICKNESS SHALL NOT EXCEED 1/4 INCH, AND BEAD WIDTH SHALL NOT EXCEED 5/8 INCH.
B. BASE METAL TYPES AND THICKNESS.
C. APPLICABLE WELD PROCESS (SMAW OR FCAW).
D. FILLER METAL PER AWS STANDARD AND ELECTRODE SPECIFICATION AND CLASSIFICATION, AS WELL AS DETAILS OF SHIELDING MATERIAL.
E. ELECTRICAL CHARACTERISTICS FOR WELD PROCESS USED SUCH AS TYPE OF CURRENT AND ACCEPTABLE RANGE OF CURRENT MEASURED IN AMPERAGE, VOLTAGE RANGE, AND ELECTRODE DIAMETER. FOR WELD FEED PROCESS, INDICATE MANUFACTURER RECOMMENDED WIRE SPEED, CONTACT DISTANCE, MELT OFF RATE AND DEPOSITION RATE.
F. A COPY OF ELECTRODE MANUFACTURER'S TECHNICAL INFORMATION AND CERTIFICATE OF CONFORMANCE.
16. TESTING LABORATORY WILL VERIFY COMPLIANCE WITH ACCEPTED WPS AND WILL PROMPTLY NOTIFY ARCHITECT (STRUCTURAL ENGINEER) IF DEVIATIONS ARE FOUND.
17. ELECTRODE DIAMETER SHALL NOT EXCEED PREQUALIFIED LIMITS SHOWN IN AWS D1.1/D1.1M TABLE 3.7, AS APPLICABLE. FOR FCAW PROCESS, MAXIMUM ELECTRODE SIZE SHALL NOT EXCEED 1/8 INCH.
18. DIFFUSIBLE HYDROGEN LEVEL FOR ELECTRODES AND ELECTRODE-FLUX COMBINATION SHALL MEET THE REQUIREMENTS TABLE 6.3 OF AWS D1.8/D1.8M.
19. DETAILS, MATERIALS, WORKMANSHIP, AND TESTING AND INSPECTION REQUIREMENTS OF WELDED JOINTS COMPRISING THE SFRS SHALL CONFORM TO THE FOLLOWING APPLICABLE STANDARDS:
- A. AWS D1.1/D1.1M "STRUCTURAL WELDING CODE - STEEL".
B. AWS D1.8/D1.8M "STRUCTURAL WELDING CODE - SEISMIC SUPPLEMENT".
C. ANSI/AISC 341, "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS", (QUALITY CONTROL AND QUALITY ASSURANCE).
D. ANSI/AISC 308 "PREQUALIFIED CONNECTIONS FOR SPECIAL AND INTERMEDIATE STEEL MOMENT FRAMES FOR SEISMIC APPLICATIONS".
20. WELD MATERIALS USED IN SFRS WELDED CONNECTIONS SHALL CONFORM TO THE FOLLOWING TOUGHNESS REQUIREMENTS:
- A. WELDED CONNECTIONS SHALL BE MADE WITH A FILLER METAL THAT CAN PRODUCE WELDS THAT HAVE A MINIMUM CHARPY V-NOTCH TOUGHNESS OF 20 FT-LB AT 70° F AS DETERMINED BY THE APPROPRIATE AWS CLASSIFICATION TEST METHOD.
B. WELDED CONNECTIONS DESIGNATED AS "DEMAND CRITICAL" SHALL BE MADE WITH A FILLER METAL CAPABLE OF PROVIDING A MINIMUM CHARPY V-NOTCH TOUGHNESS OF 40 FT-LB AT 70° F BASED ON WPS HAT INPUT ENVELOPE TESTING PRESCRIBED IN ANNEX A OF AWS D1.8/D1.8M.
21. INTERMIX OF FILLER METAL: WHEN FCAW-S FILLER METALS ARE USED IN COMBINATION WITH FILLER METALS FOR OTHER PROCESSES, INCLUDING FCAW-G, SUPPLEMENTAL CVN NOTCH TOUGHNESS TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH ONE OR MORE OF THE FOLLOWING:
- A. TESTS AS DESCRIBED IN ANNEX B OF AWS D1.8/D1.8M.
B. PORT TESTS THAT CONTAIN INTERMIX WELD METAL, WHEREIN CVN TEST SPECIMENS HAVE BEEN TAKEN FROM THE INTERMIX ZONE.
22. WELDING OF SHEET METAL AND METAL STUDS SHALL BE IN ACCORDANCE WITH AWS D1.3/D1.3M.
23. MOVEMENT CONNECTIONS SHALL BE JOINED USING BOLTS WITH NUT AND JAM NUT. SNUG TIGHTEN FIRST NUT, AND THEN BACK OFF 1/4 TURN. FULLY TIGHT JAM NUT, SLOTTED HOLES BE MILLED SMOOTH. WHEN A SLOTTED HOLE OCCURS IN THE OUTER PLATE, PROVIDE AN ASTM F436 WASHER OR A 5/16" PLATE WASHER TO COVER THE HOLE.
24. SLIDE BEARING SHALL BE CON-SLIDE TYPE CSA AS MANUFACTURED BY CON-SERV INC. OR APPROVED EQUAL. SLIDE BEARING SHALL BE ATTACHED TO THE STRUCTURE MEMBER WITH 1/8"x1" LONG FILLET WELDS AT 6" MAXIMUM SPACING. EACH SIDE SHALL HAVE AT LEAST TWO WELDS (ONE AT EACH CORNER).
25. CONTRACTOR SHALL PROVIDE FOR ALL ALLOWANCE OF 5 TONS OR 2%, WHICHEVER IS GREATER, OF STRUCTURAL STEEL TO BE FABRICATED AND/OR ERECTED DURING THE PROCESS OF WORK AS MAY BE DIRECTED BY THE ARCHITECT (STRUCTURAL ENGINEER). THE UNUSED PORTION SHALL BE CREDITED TO THE OWNER AT THE COMPLETION OF STRUCTURAL STEEL WORK.

STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF ANSI/AISC 360 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" ANSI/AISC 341 "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS" AND ANSI/AISC 303 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", AS AMENDED BY CALIFORNIA BUILDING CODE (CBC) SECTIONS 2203, 2204 AND 2205.
2. SEISMIC FORCE RESISTING SYSTEM (SFRS) IS THAT PART OF THE STRUCTURAL SYSTEM THAT HAS BEEN DESIGNED TO PROVIDE THE REQUIRED RESISTANCE TO THE SEISMIC FORCES PRESCRIBED IN ASCE/SEI 7.
3. STRUCTURAL STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS, UNLESS OTHERWISE NOTED ON DRAWINGS:
- WIDE FLANGE SHAPES, _____ ASTM A992/A992M
CHANNELS, ANGLES, M- & S-SHAPES _____ ASTM A36/A36M
PIPES _____ ASTM A53/A53M, GRADE B (Fy=35 KSI)
ASTM A500/A500M
ROUND HOLLOW STRUCTURAL SECTIONS _____ GRADE C (Fy=46 KSI)
RECTANGULAR HOLLOW STRUCTURAL SECTIONS _____ ASTM A500/A500M, GRADE C (Fy=60 KSI)
ASTM A36/A36M (UNO)
PLATES _____ ASTM A725/A725M, GRADE 50
PLATES USED IN SFRS _____ ASTM F1554, GRADE 36 (UNO)
ASTM A164, GRADE 65 WELDABLE (UNO)
UNFINISHED MACHINE BOLTS _____ ASTM A307
THREADED ROD STOCK _____ ASTM A36/A36M
- FURNISH READILY IDENTIFIABLE STRUCTURAL STEEL IN COMPLIANCE WITH CBC SECTION 2203.1.
4. HEAVY SECTIONS:
- A. HOT-ROLLED SHAPES WITH FLANGE THICKNESS EXCEEDING 2 INCH ARE CONSIDERED TO BE ROLLED HEAVY SHAPES. ROLLED HEAVY SHAPES USED AS MEMBERS SUBJECT TO PRIMARY TENSION OR COMPRESSION SHALL BE FULLY TIGHT JAM NUTS CONNECTED USING C/P GROOVE WELDS THAT FUSE THROUGH THE THICKNESS OF THE FLANGE OR THE FLANGE AND WEB. SHALL CONFORM TO THE FOLLOWING. SUCH SHAPES SHALL BE SUPPLIED WITH CHARPY V-NOTCH (CVN) IMPACT TEST RESULTS IN ACCORDANCE WITH ASTM A618M, SUPPLEMENTARY REQUIREMENTS. THE IMPACT TEST SHALL BE CONDUCTED IN ACCORDANCE WITH ASTM A673/A673M, FREQUENCY 1", AND SHALL MEET A MINIMUM AVERAGE VALUE OF 20 FT-LB ABSORBED ENERGY AT 70° F (MAX). WHEN A BUILT-UP HEAVY SHAPE IS WELDED TO THE FACE OF ANOTHER MEMBER USING GROOVE WELDS, THIS REQUIREMENT APPLIES ONLY TO THE SHAPE THAT HAS WELD METAL FUSED THE CROSS SECTION.
- C. SFRS APPLICATIONS: IN ADDITION TO THE ABOVE, HOT-ROLLED SHAPES WITH FLANGES 1 1/2 INCH THICK AND THICKER SHALL HAVE A MINIMUM CVN TOUGHNESS OF 20FT-LB AT 70° F. TESTED IN THE ALTERNATE CORE LOCATION AS DESCRIBED IN ASTM A618M SUPPLEMENTARY REQUIREMENTS S30. PLATES 2" THICK AND THICKER SHALL HAVE A MINIMUM CVN TOUGHNESS OF 20 FT-LB. F, MEASURED AT ANY LOCATION PERMITTED BY ASTM A673/A673M, FREQUENCY 1", WHERE THE PLATE IS USED FOR THE FOLLOWING:
1. MEMBERS BUILT-UP FROM PLATE.
2. EXISTING CONNECTION PLATES WHERE INELASTIC STRAIN UNDER SEISMIC LOADING IS EXPECTED.
3. THE STEEL CORE OF BUCKLING-RESTRAINED BRACES.
5. HIGH STRENGTH BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS", AS AMENDED BY CBC SECTION 2204.2. WHEN ASSEMBLED, ALL JOINT SURFACES, INCLUDING THOSE ADJACENT TO WASHERS, SHALL BE FREE OF SCALE, EXCEPT TIGHT MILL SCALE. USE STANDARD HOLES UNLESS NOTED OTHERWISE.
- A. PROVIDE ASTM A325-N, TYPE I, SNUG-TIGHTENED (ST) BOLTS WITH THREADS INCLUDED IN SHEAR PLANE, UNLESS NOTED OTHERWISE. PROVIDE ASTM A325-SC, SLIP-CRITICAL BOLTS AT CONNECTIONS IN SFRS AND WHERE SPECIFICALLY INDICATED FAYING SURFACE FOR SLIP-CRITICAL CONNECTIONS SHALL BE CLASS A, UNLESS OTHERWISE NOTED.
- B. ASTM A325-N BOLTS SHALL BE SNUG TIGHTENED IN ACCORDANCE WITH RCSC SPECIFICATION SECTION 8.1, UNLESS NOTED OTHERWISE. FULLY TENSILE WELD, ASTM A325-SC BOLTS AND ALL BOLTS REQUIRED TO BE TENSIONED BY AISI SPECIFICATION SECTION J1.10 AND RCSC SPECIFICATION SECTION 4.2. FULLY TENSIONED BOLTS SHALL BE TIGHTENED TO THE MINIMUM TENSION USING TURN-OF-THE-NUT METHOD, CALIBRATED WRENCH METHOD, OR DIRECT TENSION INDICATOR TIGHTENING METHOD.
- C. TENSION CONTROL BOLTS THAT MEET THE REQUIREMENTS OF ASTM F1852, TYPE 1, MAY BE USED IN LIEU OF ASTM A325-ST OR ASTM A325-SC BOLTS.
6. COMPOSITE STRUCTURAL BEAMS AND GIRDEES ARE DESIGNED FOR UNSHORED CONSTRUCTION UNLESS NOTED OTHERWISE.
7. HEADED STUD ANCHOR SHALL BE NELSON TYPE S3L OR TYPE H4L FLUX-FILLED HEADED SHEAR CONNECTOR STUDS (ICC EVALUATION SERVICE REPORT ER-2856), OR AN APPROVED EQUAL AND SHALL BE MADE FROM COLD DRAWN, LOW CARBON STEEL CONFORMING TO ASTM A242, GRADES C1010 THROUGH C1020, WITH A MINIMUM TENSILE STRENGTH OF 65 KSI. STUD WELDING TEST AND INSPECTION SHALL CONFORM TO AWS D1.1, CHAPTER 7. ANCHOR LENGTHS NOTED ON DRAWINGS ARE AFTER WELD LENGTHS.
8. PROVIDE UPWARD CAMBER TO ALL BEAMS SPECIFIED TO HAVE CAMBER. AMOUNT MEASURES IN THE FIELD PRIOR TO ERECTION SHALL NOT DEVIATE MORE THAN ALLOWED BY AISI SPECIFICATIONS. BEAMS WITHOUT SPECIFIED CAMBER SHALL BE FABRICATED TO SO THAT ANY MINOR CAMBER DUE TO ROLLING SHALL BE UPWARD AFTER ERECTION.
9. SUBMIT SHOP DRAWINGS TO ARCHITECT (STRUCTURAL ENGINEER) FOR REVIEW AND, UPON REQUEST, TO GOVERNING CODE AUTHORITY. INDICATE AN ERECTION SEQUENCE OF WELDING TO MINIMIZE LOCKED-UP STRESSES OR DISTORTION FOR MOMENT-RESISTING STEEL FRAMES.
10. HOURLY FIRE RESISTIVE REQUIREMENTS FOR STRUCTURAL STEEL MEMBERS SHALL BE DETERMINED USING CBC TABLE 601, BUILDING TYPES OF CONSTRUCTION AND FIREPROOFING MATERIALS ARE AS INDICATED ON ARCHITECTURAL DRAWINGS.
11. ALL STEEL, NOT ENCASED IN CONCRETE, MASONRY, OR FIREPROOFING SHALL BE SHOP PRIMED AND PAINTED PER SPECIFICATIONS, EXCEPT FOR TOP FLANGE OF BEAMS SUPPORTING METAL DECK. ANY ABRASIONS OR UNPAINTED AREAS SHALL BE TOUCHED UP AFTER ERECTION.
12. ALL STRUCTURAL STEEL AND MISCELLANEOUS METALS EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION UNLESS NOTED OTHERWISE ON ARCHITECTURAL DRAWINGS.
13. WELDING SHALL CONFORM TO LATEST EDITION OF AWS D1.1/D1.1M, AS AMENDED IN CBC SECTION 2204.1.
- A. WELDING PROCESS SHALL BE ELECTRIC ARC USING E70XX ELECTRODES. SUBMERGED ARC PROCESS (SAW) WITH AUTOMATIC WELDING MAY BE USED AS AN ALTERNATIVE.
B. WELDERS SHALL BE CERTIFIED TO CONFORM WITH AWS STANDARDS AND APPROVED BY THE GOVERNING CODE AUTHORITY.
C. NONP WELDING, INCLUDING ULTRASONIC TESTING OF FULL PENETRATION GROOVE WELDS, SHALL BE PERFORMED ON THE PREMISES OF AN APPROVED FABRICATOR.
D. MINIMUM FILLET WELD SIZE SHALL CONFORM TO AISI SPECIFICATION TABLE J2.4. WELDS LENGTHS NOTED ON DRAWINGS ARE THE NET EFFECTIVE LENGTHS REQUIRED.
E. FIELD WELD SYMBOLS NOTED ON THE DRAWINGS SHOW ENGINEERING INTENT, BUT NO ATTEMPT HAS BEEN MADE TO CLASSIFY ALL WELDS. AT FABRICATOR'S OPTION, ANY WELD INDICATED AS A FIELD WELD MAY BE SHOP WELDED AND ANY WELD INDICATED AS A SHOP WELD MAY BE FIELD WELDED.

WET-MIX SHOTCRETE (CONTINUED)

9. QUALIFICATIONS:
- A. SHOTCRETE SPECIFICATIONS SHALL BE PART OF THE PLANS.
B. THE SHOTCRETE CONTRACTOR MUST SHOW A MINIMUM OF 5 YEARS OF EXPERIENCE ON BUILDING PROJECTS AND MUST BE APPROVED BY THE ARCHITECT (STRUCTURAL ENGINEER).
C. THE SHOTCRETE SUBCONTRACTOR SHALL PRESENT, UPON REQUEST OF THE GOVERNING AGENCY, A STATEMENT OF QUALIFICATIONS SIGNED BY AN OFFICER OF THE SUBCONTRACTOR CORPORATION.
D. THE SPECIFICATION AND QUALIFICATION STATEMENT SHALL INCLUDE, BUT NOT LIMITED TO, THE FOLLOWING:
1) THE DURATION AND TYPE OF STRUCTURAL SHOTCRETE EXPERIENCE (NOT INCLUDING SWIMMING POOLS) OF THE NOZZLEMAN, THE SUBCONTRACTOR COMPANY, THE SUPERINTENDENT, AND HELPER.
2) THE SUBCONTRACTOR'S LISTED EXPERIENCE SHALL REFERENCE SPECIFIC PROJECTS APPROVED IN THE JURISDICTION.

CONCRETE MASONRY UNITS

1. CONCRETE MASONRY UNITS (CMU) SHALL BE MEDIUM WEIGHT HOLLOW LOAD BEARING UNITS CONFORMING TO ASTM C90. NORMAL WEIGHT OR LIGHTWEIGHT UNITS MAY BE USED IF APPROVED BY THE ARCHITECT (STRUCTURAL ENGINEER). USE OPEN END UNITS AT VERTICAL REINFORCING AND BOND BEAM UNITS AT HORIZONTAL REINFORCING.
2. SPECIFIED COMPRESSIVE STRENGTH (fm) OF COMPLETED CONCRETE MASONRY UNITS IS 1500 PSI UNLESS NOTED OTHERWISE. COMPLIANCE WITH SPECIFIED COMPRESSIVE STRENGTH SHALL BE BY THE UNIT STRENGTH METHOD OR BY THE PRISM TEST METHOD IN ACCORDANCE TO CBC SECTION 2105.2.2.
3. MORTAR MIX SHALL CONFORM TO THE REQUIREMENTS OF ASTM C270 FOR TYPE S MORTAR. MORTAR SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 2600 PSI AT 28 DAYS. MORTAR SANDS SHALL BE FREE OF INJURIOUS AMOUNTS OF DELETERIOUS SUBSTANCES AND ORGANIC IMPURITIES AND CONFORM TO ASTM C114.
4. GROUT SHALL CONFORM TO THE REQUIREMENTS ASTM C476 FOR COARSE GROUT. GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS. AGGREGATES FOR COARSE GROUT SHALL CONFORM TO ASTM C404.
5. CEMENT SHALL BE LOW ALKALI CONFORMING TO ASTM C150, TYPE I OR TYPE II. USE OF MASONRY CEMENT IS PROHIBITED.
6. WATER MUST BE CLEAN AND POTABLE AND FREE OF DELETERIOUS AMOUNTS OF OILS, ACIDS, ALKALIES, ORGANIC MATERIALS, AND SOLUBLE SALTS SUCH AS POTASSIUM AND SODIUM SULFATES.
7. CLEANOUTS SHALL BE PROVIDED FOR ALL GROUT POUR HEIGHTS OVER FIVE FEET, WHERE REQUIRED, CLEANOUTS SHALL BE PROVIDED IN THE BOTTOM COURSE AT EVERY VERTICAL REINFORCING BUT SHALL NOT BE SPACED GREATER THAN 32 INCHES ON CENTER FOR SOLID GROUTED MASONRY. CLEANOUTS SHALL BE SEALED AFTER INSPECTION AND BEFORE GROUTING.
8. GROUT POUR HEIGHT SHALL NOT EXCEED THAT SHOWN IN ACI 530 TABLE 1.19.1. GROUT SHALL BE PLACED IN A CONTINUOUS POUR IN GROUT LIFTS NOT EXCEEDING FIVE FEET. BETWEEN GROUT POURS, A HORIZONTAL CONSTRUCTION JOINT SHALL BE FORMED BY STOPPING GROUT POUR 1-1/2 INCHES BELOW TOP OF MORTAR JOINT.
9. CELLS SHALL BE IN VERTICAL ALIGNMENT. ALL CELLS SHALL BE GROUTED SOLID UNLESS OTHERWISE NOTED. CONSOLIDATE BY MECHANICAL VIBRATION AND RECONSOLIDATE BY MECHANICAL VIBRATION AFTER INITIAL WATER LOG AND SETTLEMENT HAS OCCURRED.
10. SEE REINFORCING STEEL GENERAL NOTES FOR REINFORCING STEEL IN CMU.
11. WALL AND PLASTER DOWELS IN FOOTINGS SHALL MATCH SIZE, GRADE, AND SPACING OF RESPECTIVE VERTICAL REINFORCING UNLESS OTHERWISE NOTED. DOWELS SHALL BE SET TO ALIGN WITH CELLS CONTAINING REINFORCING STEEL.
12. REINFORCING STEEL SHALL BE SECURED AGAINST DISPLACEMENT PRIOR TO GROUTING USING WIRE POSITIONERS AT INTERVALS NOT EXCEEDING 200 BAR DIAMETERS, PROVIDE A MINIMUM OF ONE BAR DIAMETER, LARGEST SIZE AGGREGATE PLUS 1/4 INCH, OR 1/2 INCH, WHICHEVER IS GREATER. GROUT BETWEEN MAIN REINFORCING STEEL AND MASONRY UNIT.
13. REINFORCING STEEL, EXCEPT JOINT REINFORCING, SHALL BE COMPLETELY EMBEDDED IN MORTAR OR GROUT AND HAVE A MINIMUM COVER, INCLUDING CMU SHELL, AS FOLLOWS:
- A. CMU NOT EXPOSED TO EARTH OR WEATHER: 1-1/2"
B. CMU EXPOSED TO EARTH OR WEATHER:
NO. 6 AND LARGER: 2"
NO. 5 AND SMALLER: 1-1/2"

14. MINIMUM CLEARANCE BETWEEN PARALLEL REINFORCING STEEL SHALL BE ONE INCH, NOMINAL BAR DIAMETER, OR 4/3 TIMES THE MAXIMUM SIZE OF AGGREGATE, WHICHEVER IS GREATER.
15. MINIMUM CLEAR DISTANCE BETWEEN VERTICAL BARS IN COLUMN AND PILASTERS SHALL NOT BE LESS THAN 1 1/2 TIMES THE NOMINAL BAR DIAMETER, NOR LESS THAN 1 1/2 INCHES.
16. PROVIDE ONE INCH MINIMUM GROUT COVER AROUND ANCHOR BOLTS, REINFORCING STEEL DOWELS, AND OTHER INSERTS PENETRATING CMU SHELL. ANCHOR BOLTS SHALL BE HEADED TYPE BOLTS. ANCHOR BOLTS WITH HOOKED ENDS ARE NOT PERMITTED.
17. REFER TO ARCHITECTURAL DRAWINGS FOR SURFACE AND HEIGHT OF MASONRY UNITS, LAYING PATTERN AND JOINT TYPE. IF NOT SPECIFIED OTHERWISE ON ARCHITECTURAL DRAWINGS, USE 8"x8"x16" NATURAL GRAY PRECISION UNITS IN RUNNING BOND PATTERN WITH TOOLED CONCAVE MORTAR JOINT.
18. MORTAR JOINTS SHALL 3/8 INCH THICK (UNLESS NOTED OTHERWISE), EXCEPT THAT THICKNESS OF STARTER MORTAR JOINT PLACED OVER FOUNDATIONS SHALL NOT BE LESS THAN 1/4 INCH AND MORE THAN 3/4 INCH.
19. UNLESS OTHERWISE NOTED, FULL ALLOWABLE STRESSES ARE USED IN DESIGN. SPECIAL INSPECTION REQUIRED FOR ERECTION OF ALL CONCRETE MASONRY UNITS.

WET-MIX SHOTCRETE

1. STRUCTURAL WET-MIX SHOTCRETE SHALL BE ALLOWED WHEN SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS AND WHERE THE OWNER, CONTRACTOR AND CONCRETE SUPPLIER COMPLY WITH THESE PROCEDURES, IN ADDITION TO THE REQUIREMENTS OF THE CALIFORNIA BUILDING CODE (CBC) SECTION 1913.
2. DEFINITIONS:
- A. SHOTCRETE IS MORTAR OR CONCRETE PNEUMATICALLY PROJECTED AT A HIGH VELOCITY ONTO A SURFACE.
B. WET-MIX SHOTCRETE IS SHOTCRETE IN WHICH THE INGREDIENTS INCLUDING WATER ARE MIXED BEFORE INTRODUCTION INTO THE PLACING EQUIPMENT.
- LIMITATIONS:
- A. STRUCTURAL WET-MIX SHOTCRETE SHALL NOT BE PLACED WHERE THE STREAM FROM THE NOZZLE CANNOT DIRECTLY IMPINGE ON THE SURFACE ON WHICH THE SHOTCRETE IS TO BE PLACED. WHERE CONDITIONS PRECLUDE THE POSSIBILITY OF OBTAINING CORES FROM THE STRUCTURE, THIS METHOD SHALL NOT BE USED.
B. THE MAXIMUM SIZE OF REINFORCEMENT SHALL BE #5 BARS UNLESS IT CAN BE DEMONSTRATED BY PRE-CONSTRUCTION TESTS THAT ADEQUATE ENCASEMENT OF LARGER BARS WILL BE ACHIEVED.
C. LAP SPLICES OF REINFORCING BARS SHALL UTILIZE NONCONTACT LAP SPLICES UNLESS IT CAN BE DEMONSTRATED BY PRE-CONSTRUCTION TESTS THAT ADEQUATE ENCASEMENT OF BARS WILL BE ACHIEVED, AND PROVIDED THAT THE SPLICE IS ORIENTED SO THAT A PLANE THROUGH THE CENTER OF THE LAPPED BARS IS PERPENDICULAR TO THE SURFACE OF THE SHOTCRETE.
D. SHOTCRETE SHRINKAGE SHALL BE LIMITED TO 0.06 PERCENT AT THREE MONTHS AS DETERMINED BY ASTM C157.
E. SHOTCRETE MAY ONLY BE APPLIED TO TIED COLUMNS WHERE THE SPACING OF THE REINFORCING STEEL IS THE SAME AS FOR WALLS UNLESS IT CAN BE DEMONSTRATED BY PRE-CONSTRUCTION TESTS THAT ADEQUATE ENCASEMENT OF THE BARS USED IN THE DESIGN CAN BE ACHIEVED.
- CODES:
- A. APPLICABLE PARTS OF ACI 506R SHALL APPLY. APPLICATIONS OF STRUCTURAL WET-MIX SHOTCRETE SHALL HAVE A COPY OF ACI 506R AT THE WORK SITE AT THE TIME OF SHOTCRETE APPLICATION. THE WORD "SHALL" SHALL BE SUBSTITUTED WHENEVER THE WORD "SHOULD" OCCURS IN ACI 506R.
B. MAINTAIN A CATCH CAN 506.2 AT THE SITE DURING ALL SHOTCRETE WORK.
C. THE CONCRETE MIX SHALL COMPLY WITH CBC SECTION 1905 AND SHALL NOT BE BATCHED VOLUMETRICALLY.
D. ALL OTHER APPLICABLE CODE REQUIREMENTS SHALL APPLY, INCLUDING MAXIMUM TIME IN MIXER.
- INSPECTION:
- A. SHOTCRETE REQUIRES CONTINUOUS INSPECTION BY A REGISTERED DEPUTY INSPECTOR.
B. CONTINUOUS INSPECTION SHALL BE PROVIDED FOR THE PLACEMENT OF ALL REINFORCING STEEL, THE PLACEMENT OF SHOTCRETE AND THE ASSEMBLY, SHOOTING, TESTING AND DISASSEMBLY OF PRE-CONSTRUCTION TEST PANELS.
- PRE-CONSTRUCTION TEST:
- A. TEST PANELS SHALL BE REPRESENTATIVE OF THE PROJECT AND SIMULATE JOB CONDITIONS AS CLOSE AS POSSIBLE. PANEL THICKNESS AND REINFORCING SHALL REPRODUCE THE THICKEST AND MOST CONGESTED AREA SPECIFIED IN STRUCTURAL DESIGN. MULTIPLE TEST PANELS MAY BE NECESSARY TO PROVIDE A COMPLETE REPRESENTATION OF THE ACTUAL CONDITIONS WHERE SHOTCRETE IS TO BE USED.
B. THE TEST PANELS SHALL BE SHOT AT THE SAME ANGLE, USING THE SAME EQUIPMENT AND NOZZLEMAN, AND WITH THE SAME CONCRETE MIX DESIGN THAT WILL BE USED ON THE PROJECT.
C. THE TEST PANELS SHALL BE CURED, THEN DISASSEMBLED, EXAMINED, SAWED AND/OR CORE DRILLED AT THE DISCRETION OF THE STRUCTURAL ENGINEER AND INSPECTOR. TEST RESULTS SHALL BE USED TO DETERMINE THE SHOTCRETE WORK.
D. TEST PANELS SHALL BE A MINIMUM OF A FEET SQUARE.
- MATERIALS:
- A. CEMENT SHALL COMPLY WITH ASTM C150, TYPE I OR TYPE II LOW ALKALI.
B. AGGREGATE SHALL BE NORMAL WEIGHT COMPLYING WITH ASTM C33. COMBINED AGGREGATE GRADATION SHALL MEET ACI 506R, TABLE 1.1, GRADATION NO. 2.
C. WATER SHALL BE CLEAN AND POTABLE.
D. ADD WATERPROOFING ADMIXTURE PER WATERPROOFING CONSULTANTS' RECOMMENDATIONS AT PERIMETER RETAINING WALLS.
- CONDITIONS:
- A. FLASH COATS AND FINISH COATS ARE NOT PERMITTED UNLESS FULL DESIGN THICKNESS IS ACHIEVED WITHOUT CONSIDERING THE FLASH COAT OR FINISH COAT.
B. MINIMUM SLUMP SHALL BE 1 1/2" AND MAXIMUM SLUMP SHALL BE 2 1/2". SLUMP SHALL BE MEASURED AT THE POINT OF DISCHARGE FROM THE MIXER, EXCEPT THE BUILDING INSPECTOR MAY REQUIRE SLUMP TESTS AT THE DISCHARGE POINT WHERE WATER MAY HAVE BEEN ADDED.
C. A CAPABLE NOZZLEMAN'S HELPER WITH AN AIR BLOW PIPE SHALL BE PROVIDED TO ASSIST THE NOZZLEMAN IN KEEPING ALL REBOUND BUILD-UP OUT OF THE WORK.
D. ADDITIONAL WORKERS MAY BE REQUIRED TO TAKE THE REBOUND FROM THE WORK IF THE REBOUND CANNOT BE REMOVED BY THE AIR BLOW PIPE.
E. NO KEY WAYS OR EMBEDMENTS SHALL BE PLACED IN THE FRONT FACE THAT WILL INTERFERE WITH THE STREAM FROM THE NOZZLE.
F. THE CONTRACTOR AGREES TO PROVIDE A DESIGNATED LIAISON BETWEEN HIS CREW, THE DEPUTY INSPECTOR AND THE GOVERNING AGENCY.
G. THE DEPUTY INSPECTOR SHALL BE INTERVIEWED AND APPROVED BY GOVERNING AGENCY PRIOR TO INSPECTING WORK AT THE JOB SITE. ONE DEPUTY INSPECTOR SHALL BE ASSIGNED TO EACH NOZZLE.
H. RIGID OR OTHER APPROVED BACKING SHALL BE PLACED AGAINST THE EARTH WHERE THERE IS ANY POTENTIAL OF SOIL BEING DISLODGED IN SUFFICIENT QUANTITY TO DAMAGE THE SHOTCRETE DURING THE APPLICATION OF THE SHOTCRETE. RIGID OR OTHER APPROVED NON-ORGANIC BACKING SHALL BE USED TO BRIDGE VOIDS IN THE EMBANKMENT.
I. IN THE EVENT THAT A PREVIOUSLY PRESUMED SOLID EMBANKMENT SHOULD SLOUGH OR SHED DIRT IN SUFFICIENT QUANTITY TO DAMAGE THE CONCRETE, THE WET-MIX SHOTCRETE PLACEMENT WORK IN THAT AREA SHALL CEASE UNTIL RIGID BACKING IS INSTALLED AND CONTAMINATED SHOTCRETE IS REMOVED.
J. TO REDUCE THE POSSIBILITY OF LAMINATIONS, SECTIONS SHOULD BE GUNNED TO THEIR FULL DESIGN THICKNESS IN ONE LAYER BY BENCH OR SHELf SHOOTING.
K. THE HEIGHT OF A LAYER SHALL NOT EXCEED 3 FEET AND SUCCEEDING LAYERS SHALL NOT BE PLACED IN LESS THAN 3 HOURS. NO SLOUGHING OR SAGGING SHALL BE PERMITTED. WHEN SPECIFICALLY DESIGNED BY THE ENGINEER OR RECORDED THAT A SUCCEEDING LAYER IS TO BE PLACED IN LESS THAN 3 HOURS, A LESSER TIME MAY BE APPROVED BY THE GOVERNING AGENCY.
L. DETAILS OF COLD JOINTS, INCLUDING SLOPE OF JOINTS, SHALL BE SHOWN ON THE APPROVED PLANS. WHEN SHOOTING UP TO THE UNDERSIDE OF EXISTING CONCRETE, THE LAST 2 INCHES SHALL BE DRY PACKED OR AN APPROVED METHOD OF DRY PNEUMATIC CONCRETE USED. EXCEPTION: PROVIDED THE DETAIL OF THE JOINT IS SLOPED SO THAT THE CLOSURE OF THE COLD JOINT MADE WITH STRUCTURAL WET-MIX SHOTCRETE DOES NOT SAG AWAY FROM THE UPPER SURFACE AND PROVIDED BOTH SIDES OF THE COLD JOINT HAVE TAKEN THEIR INITIAL SET, THE JOINT CLOSURE MAY BE MADE WITH WET-MIX SHOTCRETE.
M. REINFORCING STEEL SHALL BE SECURELY TIED IN PLACE IN A MANNER THAT PREVENTS ANY MOVEMENT DURING THE APPLICATION OF THE SHOTCRETE. NON-CONCRETE OR MASONRY TO RECEIVE SHOTCRETE SHALL HAVE THE ENTIRE SURFACE THOROUGHLY CLEANED AND ROUGHENED AND JUST PRIOR TO RECEIVING SHOTCRETE, SHALL BE THOROUGHLY CLEANED OF ALL DEBRIS, DIRT AND DUST. CONCRETE AND MASONRY SHALL BE WETTED BEFORE SHOTCRETE IS DEPOSITED, BUT NOT SO WET AS TO OVERCOME SUCTION. SAND USED FOR SANDBLASTING SHALL BE CLEAN, SHARP AND UNIFORM IN SIZE, WITH NO PARTICLES THAT WILL PASS A 50-MESH SCREEN.



howard laks architects
1546 wealth street
san jose, california 95128
phone : 310-392-4405
fax : 310-392-2220

CONSULTANTS

1546 N. Market Avenue
San Jose, California 95128
Phone: 310-392-4405