DSA IR 17-1

SPECIAL INSPECTION PROGRAM (SIP)

Disciplines: Structural

History: Revised 01/21/25
Issued 05/22/24

Division of the State Architect (DSA) documents referenced within this publication are available on the DSA Forms or DSA Publications webpages.

PURPOSE

The DSA Special Inspection Program (SIP) was developed to ensure that all DSA accepted laboratories performing special inspections or field testing meet all Quality Management System (QMS) requirements specified by the California Administrative Code (CAC), DSA's Laboratory Evaluation and Acceptance Program (LEA) and ASTM E329.

The following criteria will assist laboratories in preparing for future SIP evaluations. The criteria are in addition to other requirements set forth in the CAC and LEA program documents.

SCOPE

The following Special Inspection (SI) and Structural Testing (ST) disciplines listed in Table 1 are subject to the SIP requirements.

TABLE 1 – Disciplines		
Soil and Earthwork (SI)	Shotcrete (SI)	Structural Welding (SI)
Batch Plant Inspection (SI)	Post-Installed Anchors (SI)	High-Strength Bolting (SI)
Reinforced Concrete (SI)	Post-Installed Anchors (ST)	Nondestructive Testing (ST)
Prestressed Concrete (SI)	Structural Masonry (SI)	Sprayed Fire-Resistant Materials (SI)

BACKGROUND

DSA has partnered with the American Association of State Highway Transportation Officials (AASHTO) re:source to develop a comprehensive on-site evaluation program known as the Special Inspection Program (SIP). This program enhances effectiveness of DSA's LEA Program by implementing necessary improvements to evaluation and acceptance criteria for participating laboratory's Quality Management System (QMS) and oversight of special inspection and field-testing personnel statewide.

The SIP evaluation will be conducted by AASHTO re:source personnel during a laboratory's regularly scheduled AASHTO re:source on-site assessment. Participation in the SIP evaluation is required for all laboratories providing SI and/or ST in the field on projects under DSA jurisdiction. DSA laboratory evaluation criteria will be consistent with the requirements stated herein.

SPECIAL INSPECTION PROGRAM (SIP)

1. REFERENCED DOCUMENTS

1.1 California Code of Regulations, Title 24.

- Part 1 – California Administrative Code (CAC).
- Part 2 – California Building Code (CBC).

Discipline	Referenced Documents
Soil and Earthwork (SI)	CBC Section 1705*A*.6
Batch Plant (SI)	CBC Section 1705*A*.3.3, IR 17-13
Reinforced Concrete (SI)	CBC Section 1705*A*.3, Table 1705*A*.3
Prestressed Concrete (SI)	CBC Section 1705*A*.3.4
Shotcrete (SI)	CBS Section 1705*A*.3.9
Post-Installed Anchors (SI)	CBC Section 1705*A*.3.8
Post-Installed Anchors (ST)	CBC Section 1705*A*.3.8
Structural Masonry (SI)	CBC Section 1705*A*.4
Structural Welding (SI)	CBC Section 1705*A*.2.5, Table 1705*A*.2.1, IR 17-3
High-Strength Bolting (SI)	CBC Section 1705*A*.2.6, Table 1705*A*.2.1, IR 17-9
Nondestructive Testing (ST)	CBC Section 1705*A*.2.5, Table 1705*A*.2.1, IR 17-2
Sprayed Fire-Resistant Materials (SI)	CBC Section 1705*A*.15

1.2 Interpretation of Regulations (IR) and other key documents

- IR 17-2: Nondestructive Testing (NDT) of Structural Welds.
- IR 17-3: Structural Welding Inspection.
- IR 17-8: Sampling and Testing of High-Strength Structural Bolts, Nuts and Washers.
- IR 17-9: High-Strength Structural Bolting Inspection.
- IR 17-10: Sampling, Testing and Tagging of Reinforcing Bars.
- IR 17-11: Identification, Sampling and Testing of Threaded Steel Anchor Bolts and Anchor Rods.
- IR 17-12: Special Inspection Reporting Requirements.
- IR 17-13: Batch Plant Inspection.
- ASTM E329: Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

1.3 Terminology

1.3.1 DSA Accepted Laboratory: A laboratory that performs special inspection and/or materials testing and has met all administrative and technical requirements as established by the DSA LEA Program. DSA maintains a published list online of accepted laboratories.

1.3.2 Laboratory of Record (LOR): The DSA accepted laboratory selected and employed by the school board to conduct the required structural tests and special inspections for a specific project under DSA jurisdiction.

1.3.3 Engineering Manager (EM): The California registered civil engineer, evaluated and accepted by DSA as the Engineering Manager of a DSA accepted laboratory. The EM must be employed on a full-time basis at the location of the accepted facility. The EM is responsible for supervision and responsible control of all field and laboratory testing, special inspection and DSA required reporting.

1.3.4 Structural Test (ST): A procedure performed on a structural material or completed element of the structure to determine design conformance such as strength, ductility, quality or other specified properties of the material or element. All structural tests shall be conducted by a qualified representative of a DSA accepted laboratory.

1.3.5 Special Inspection (SI): Visual examination of construction materials, installation, fabrication, erection, or process to verify constructed work conforms with the DSA-approved construction documents. Special inspections shall be performed by a qualified representative of a DSA accepted laboratory and supervised by the laboratory's Engineering Manager. Special inspectors shall document all special inspections in "detailed" daily special inspection reports (see *IR 17-12: Special Inspection Reporting Requirements*). Special inspection may be required as "Continuous" or "Periodic" by the approved construction documents as defined by Chapter 2, CBC.

1.3.6 Test Technician: A qualified representative of a DSA accepted laboratory, who is trained and certified to sample, handle, transport and conduct tests on structural materials or on completed assemblies.

2. EVALUATIONS

All laboratories seeking DSA acceptance or those currently accepted in DSA's LEA Program that perform special inspection or structural testing for any of the disciplines listed in Table 1 are required to participate in the SIP evaluations.

2.1 The SIP evaluation will occur during the regularly scheduled on-site assessment visit from AASHTO re:source. Refer to the AASHTO re:source webpage for additional information on the re:source SIP evaluation process.

2.2 For laboratories that do not receive AASHTO re:source on-site assessments, a DSA representative will perform the SIP evaluation.

3. QUALITY MANAGEMENT SYSTEM (QMS)

3.1 Organization

The laboratory shall document the ownership and management structure including the names, affiliations and positions of principal officers and directors.

3.1.1 The laboratory shall maintain an organizational chart which shows the following:

- Relationships with partner organizations, the parent company and main office.
- Legal name and address of the laboratory facility.
- Any relationships with subcontracted entities performing structural testing or special inspection work under DSA jurisdiction.
- Positions, titles and names of all supervisory personnel related to special inspection from relevant internal organizational components.
- Lines of responsibility and authority.

- The responsible Engineering Manager, or if different, the responsible geotechnical engineer.
- The revision date of the chart.

3.2 Position Descriptions

The laboratory shall maintain position descriptions of key operational positions listed on the organizational chart.

3.2.1 Position descriptions shall identify the position and include a description of the duties, required skills, certification requirements, education and experience.

3.3 Biographies

The Engineering Manager shall document the experience and job training for each special inspector (refer to CAC 4-335.1[b]2). Biographies and associated records shall be maintained for a minimum of three years after the person has left employment. The biographies shall include the following:

- Employee name.
- Position title (must match organizational chart and position description).
- Education.
- Employment history (include firm names and duration of employment).
- Areas of special inspections (disciplines) inspected.
- List of relevant projects (include project name, location and disciplines inspected).
- Registrations and Certifications.

3.4 Special Inspection and Field Testing Procedures

The laboratory's QMS shall include detailed written procedures for each SI discipline and ST performed (See Table 2). These procedures shall clearly outline requirements and expectations for personnel performing special inspection and structural tests on projects under DSA jurisdiction, including but not limited to the following:

3.4.1 Required documents.

3.4.2 Required qualifications, experience and certification.

3.4.3 Process for ensuring personnel comprehend and utilize DSA-approved documents and applicable referenced standards.

3.4.4 Instructions for conducting special inspection activities.

3.4.5 Special inspector duties and responsibilities.

3.4.6 Instructions for all associated material sampling and testing in the field.

3.4.7 Instructions for the proper use of field-testing equipment, including field calibration or verification.

3.4.8 Inspection report requirements.

Table 2 – Written Procedures for Special Inspection and Structural Testing[1]				
Discipline	**SI / ST Procedures**	**Field Sampling**	**Equipment**	**Reporting**
Soil and Earthwork (SI)				
Batch Plant Inspection (SI)				
Reinforced Concrete (SI)				
Prestressed Concrete (SI)				
Shotcrete (SI)				
Post-Installed Anchors (SI)				
Post-Installed Anchors (ST)				
Structural Masonry (SI)				
Structural Welding (SI)				
High-Strength Bolting (SI)				
Nondestructive Testing (ST)				
SFRM (SI)				

[1]Note: In cases where model code and/or specifications exist which detail specific instructions and/or procedures to be performed, the laboratory may reference the appropriate section or specification followed. It is not intended that the laboratory duplicate this information in their internal procedure(s).

3.4.9 Describe how deviations from the DSA-approved construction documents or non-conforming workmanship are addressed.

3.4.10 Describe special inspection reporting requirements for both conforming and non-conforming construction or workmanship.

3.5 Training Procedures and Records

3.5.1 Written Procedures

The laboratory shall maintain a written procedure describing the methods used to ensure that new special inspectors and test technicians are trained to perform tests and inspections in accordance with standard procedures. The document shall also indicate what position or employee is responsible for the laboratory training program and the maintenance of training records.

3.5.2 Training Records

The laboratory shall maintain records of training which include the following:

- Name of trainee and trainer.
- Dates of training.
- Name of any external organizations used for training.
- Test method or inspection area covered.

Note: Different methods may be used depending on the experience level of the staff, including (1) on-the-job training (one-on-one), (2) formal in-house training sessions, and (3) training by

external organizations. An individual with experience in a specific inspection method or area may only need to have their competency evaluated by the laboratory.

3.6 Competency Evaluation Procedures and Records

Competency evaluations shall be performed for all special inspection and test technicians prior to their performing independent special inspection or field testing activities. Competency evaluations shall also be performed for field supervisory personnel that perform special inspection or field testing. Individual certification is not a replacement for competency evaluation.

3.6.1 Competency evaluations shall be performed at intervals thereafter not exceeding three years.

3.6.2 The laboratory's Engineering Manager and/or Supervisory personnel are responsible for ensuring competency evaluations are performed within the required interval, in accordance with the laboratory's written procedures. Competency evaluations shall be performed by a qualified and experienced individual who is approved by the Engineering Manager or Supervisor.

3.6.3 The competency evaluation may include a written, verbal, or performance demonstration. As applicable, the following general topics shall be included as components of the competency evaluation:

- Plan reading and building code knowledge.
- Applicable referenced standards knowledge.
- Field testing and special inspection procedures.
- Proper use of field testing equipment and requirements for field calibration or verification.
- Sample preparation, storage and transportation of test specimens.
- Field testing and special inspection reporting requirements.

3.6.4 Competency evaluations may be performed on a construction project site, a fabricator's facility, material supplier, the laboratory facility, or any combination thereof.

3.6.5 Written Procedures

The laboratory shall maintain written competency evaluation procedures which cover each special inspection and field testing procedure applicable personnel perform to verify their knowledge and ability to perform the required duties in accordance with standard procedures and code requirements. The procedures shall include the following:

- The position or employee responsible for ensuring the competency evaluations are performed and associated records are maintained.
- Location of records.
- Interval of competency evaluations.
- The position which performs the competency evaluations.
- A description of evaluation methods used to perform the competency evaluations (written, verbal, procedural demonstration).

3.6.6 Competency Evaluation Records

The laboratory shall maintain records of competency evaluations which shall include the following:

- Name of the individual being evaluated.
- Special inspection or testing procedures evaluated.
- Topics covered during evaluation.
- Methods used to perform the competency evaluation (written, verbal, procedural demonstration).
- Evaluation date.
- Evaluator's name and title.
- Competency evaluation findings, including a summary of the methods used to perform the competency evaluation, a detailed description of the areas of non-compliance and any corrective actions taken.

3.6.7 Evaluation Schedule/Matrix

The laboratory shall maintain a schedule/matrix of required competency evaluations for all test technicians and special inspectors which includes the following:

- Employee name.
- Discipline or test evaluated.
- Last evaluation date.
- Next due date or interval.

4. EQUIPMENT

4.1 Inventory Requirements

The laboratory shall maintain an inventory list of all significant equipment related to special inspection and field testing, including equipment which requires calibration or verification (See Table 3). The inventory list shall include the following:

- Type of equipment.
- Manufacturer.
- Serial number or lab ID.
- Date received/placed in service.
- Condition when received.
- Calibration or verification date and next due date.
- Current location.

4.2 Equipment Assignments

All equipment commonly assigned to individual inspectors and test technicians shall be accounted for in the inventory and in the calibration or verification records. See items marked with an "*" in Table 3. Equipment in the inventory which is assigned to an individual must include the assignee's name or initials.

Table 3 – Equipment Inventory Requirements	
Discipline	**Item**
Post-Installed Anchors	Hydraulic Ram/Pressure Gauge System (Proof Load System) *Including bridging, grips, wedges and couplers.* Torque Wrenches*****
Reinforced Concrete	Slump Cones*
	Air Meters (Volumetric)
	Air Meters (Pressure)
	Temp Measuring Devices
Structural Masonry	Slump Cones*****
Structural Welding	AC/DC Volt-ammeters*****
	Weld Profile Gauges
	Infrared Thermometer
High-Strength Bolting	Bolt Tension Calibrator, with plates and bushings
Nondestructive Testing (NDT): Magnetic Particle Testing (MT)	Contour Probes (AC and DC Yokes)*****
	Lift Test Weights (10 and 40 lb. weights)*****
	Particle Applicators
	Pie Gauges*****
Nondestructive Testing (NDT): Ultrasonic Testing (UT)	Ultrasonic Test Scope*****
	Shear Wave and Straight Beam Transducers*****
	DSC and IIW Calibration Blocks*

4.3 Equipment Calibration or Verification (C/V)

4.3.1 Written Procedures

The laboratory shall have detailed written procedures for performing all in-house calibrations and verifications not addressed in the standards. The procedures shall describe the equipment required to perform the calibration or verification and include a detailed procedure for performing the work.

4.3.2 Record Requirements

The laboratory shall maintain calibration and verification records for all equipment listed in Table 4. The records shall include the following:

- The name of the equipment.
- The manufacturer's name.
- The serial number or other unique identification.
- Calibration or verification date and next due date.
- Name of the individual performing the work.
- Detailed results of the work performed.
- A reference to the procedure used.

Table 4 – Equipment C/V Requirements		
Discipline	**Item**	**C/V Interval (months)**
Post-Installed Anchors	Hydraulic Ram/Pressure Gauge System (Proof Load System)	12
	Torque Wrenches	12
Reinforced Concrete	Slump Cones	12
	Air Meters (Volumetric)	12
	Air Meters (Pressure)	3
	Temp Measuring Devices	12
Structural Masonry	Slump Cone Kits	12
Structural Welding	AC/DC Volt-ammeters	12
High-Strength Bolting	Bolt Tension Calibrator	12
Nondestructive Testing (NDT): Magnetic Particle Testing (MT)	Contour Probes (AC and DC Yokes)	6
	Lift Test Weights (10 and 40 lb. weights)	Initial check
Nondestructive Testing (NDT): Ultrasonic Testing (UT)	Ultrasonic Test Scope	2

5. PERSONNEL

5.1 Engineering Manager (refer to CAC 4-335.1[b]2)

The Engineering Manager shall be a State of California registered Civil Engineer and must be a full-time employee at a single laboratory facility and not employed by any other laboratory.

5.1.1 Field Supervisor of Special Inspection

The Field Supervisor shall be a full-time employee of the laboratory and be certified in all areas they provide supervision (See Table 5) or have a current professional engineering license.

5.1.2 The Engineering Manager may serve in the role of a Field Supervisor provided they are a licensed PE with the required experience. In this case, certification for all areas they provide supervision is not required. This is only acceptable if the PE performs the daily duties typically associated with the Field Supervisor.

5.1.3 The Field Supervisor shall have at least three years of experience similar to the construction, field testing, or special inspection work they supervise.

Table 5 – Field Supervisor Certification Requirements	
Discipline Supervised	**Required Certification**
Soil and Earthwork (SI)	None Required
Batch Plant Inspection (SI)	American Concrete Institute (ACI) Field 1 or Lab Testing Tech Grade 1
Reinforced Concrete (SI)	International Code Council (ICC) Reinforced Concrete
Prestressed Concrete (SI)	ICC Prestressed Concrete
Shotcrete (SI)	DSA Shotcrete
Post-Installed Anchors (SI)	ACI Post-Installed Concrete Anchor Inspector
Post-Installed Anchors (ST)	None Required
Structural Masonry (SI)	DSA Masonry Inspector or ICC Structural Masonry
Structural Welding (SI)	American Welding Society (AWS) Certified Welding Inspector (CWI), Senior Certified Welding Inspector (SCWI), Canadian Welding Bureau (CWB), Level 2 or 3 or ICC Structural Steel and Welding
High-Strength Bolting (SI)	ICC Structural Steel and Bolting S1
Nondestructive Testing (ST)	American Society for Nondestructive Testing (ASNT) Certified Level III
SFRM (SI)	ICC Spray-Applied Fireproofing

5.2 Special Inspectors

The laboratory shall employ one or more special inspectors for each discipline for which the laboratory is seeking LEA acceptance (See Table 6).

5.2.1 The special inspector shall meet the minimum certification requirements listed in Table 6.

5.2.2 The special inspector shall be a full-time employee of the laboratory at the location seeking acceptance.

5.2.3 All special inspectors shall be at least 25 years of age and have a minimum of three years of experience in similar types of construction.

Table 6 – Minimum Certification Requirements for Special Inspectors		
Special Inspection Discipline	**Required Certification**	**Notes**
Soil and Earthwork (SI)	None Required	A
Batch Plant Inspection (SI)	ACI Field 1 or Lab Testing Tech Grade 1	
Reinforced Concrete (SI)	ICC Reinforced Concrete	B
Prestressed Concrete (SI)	ICC Prestressed Concrete	
Shotcrete (SI)	DSA Shotcrete Inspector	C
Post-Installed Anchors (SI)	ACI Post-Installed Concrete Anchor Inspector	
Post-Installed Anchors (ST)	None Required	D
Structural Masonry (SI)	DSA Masonry Inspector	E
Structural Welding (SI)	AWS CWI, SCWI or CWB (Level 2 or 3)	F
High-Strength Bolting (SI)	ICC Structural Steel and Bolting S1	
Nondestructive Testing (ST)	ASNT Certified Level II	
SFRM (SI)	ICC Spray-Applied Fireproofing	

NOTES:

A. *None required but shall have internal written exam and competency evaluation.*
B. *ACI Field Grade 1 is a prerequisite for the ICC Reinforced Concrete Certification.*
C. *ACI Field Grade 1 and ICC Reinforced Concrete Cert. are prerequisites for DSA Shotcrete Certification.*
D. *Competency evaluations shall include: 1) anchor torque and load test equipment and set up, 2) test frequency, 3) test loads and test acceptance criteria, (CBC Section 1910A.5 "Tests for post-installed anchors in concrete").*
E. *ICC Structural Masonry Certification is a prerequisite for DSA Masonry Certification.*
F. *American Welding Society Certified Welding Inspector (CWI) or Senior (SCWI), Canadian Welding Bureau (CWB) Level 2 or 3 as defined by Standard W178.2.*

6. LITERATURE REQUIREMENTS

The laboratory shall have access to the literature (standards) applicable to the scopes of services which the laboratory performs (See Table 7), including referenced standards (ASTMs). Publications may be available in digital or in hardcopy form.

6.1 The laboratory shall have a procedure describing how employees access the literature (standards) and how it ensures changes in the standards are communicated to employees in a timely manner.

Table 7 – Required Literature/Publications
General
California Administrative Code: California Code of Regulations, Title 24, Part 1
California Building Code: California Code of Regulations, Title 24, Part 2, Volumes 1 and 2
Batch Plant, Reinforced Concrete and Prestressed Concrete
ACI 318: Building Code Requirements for Structural Concrete
Shotcrete
ACI 318: Building Code Requirements for Structural Concrete
ACI 506R: Guide to Shotcrete
ACI 506.2: Specification for Shotcrete
Post-Installed Anchors (required for Special Inspection and Structural Testing)
ACI 355.2: Qualification of Post-Installed Mechanical Anchors in Concrete
ACI 355.4: Qualification of Post-Installed Adhesive Anchors in Concrete
Structural Masonry
TMS 402/602: Building Code and Specification for Masonry Structures
Structural Welding
ANSI/AISC 360: Specification for Structural Steel Buildings
ANSI/AISC 341: Seismic Provisions for Structural Steel Buildings
AWS D1.1/D1.1M: Structural Welding Code—Steel
AWS D1.2/D1.2M: Structural Welding Code—Aluminum
AWS D1.3/D1.3M: Structural Welding Code—Sheet Steel
AWS D1.4/D1.4M: Structural Welding Code—Steel Reinforcing Bars
AWS D1.8/D1.8M: Structural Welding Code—Seismic Supplement
High-Strength Bolting
ANSI/AISC 360: Specification for Structural Steel Buildings
ANSI/AISC 341: Seismic Provisions for Structural Steel Buildings
RCSC Specification for Structural Joints Using High-Strength Bolts
AISC Steel Construction Manual
Nondestructive Testing
ANSI/ASNT CP-189: ASNT Standard for Qualification and Certification of NDT Testing Personnel
ANSI/ASNT Recommended Practice No. SNT-TC-1A
ASTM Volume 03.03: Nondestructive Testing

7. ADDITIONAL CRITERIA BY DISCIPLINE

In addition to the discipline specific requirements listed in Sections 1 thru 6 above, additional criteria by discipline for which the laboratory is seeking DSA LEA approval is required.

7.1 Soil and Earthwork (SI)

7.1.1 Geotechnical or Soils Engineer

If different than the Engineering Manager, shall be registered as a California licensed Geotechnical Engineer. The Geotechnical Engineer may be a full-time employee of the laboratory or a consultant.

7.1.2 Special Inspectors

Personnel performing soil and earthwork inspection shall be qualified internally by written exam and competency evaluation by the laboratory's Engineering Manager or Geotechnical Engineer (or assigned designee).

Written exams shall include the following, as applicable: (1) the significance of the test or inspection method, (2) sampling, plan reading and reporting of results, (3) field testing or inspection procedure(s) which evaluates the person's ability to perform the required duties and evaluate the testing/inspection results for specification and code compliance.

7.2 Post-Installed Anchors (ST)

7.2.1 Equipment: Torque Wrenches

Torque wrenches shall be zero to 150 ft-lb range. Wrenches may be click, beam, dial or electronic-type and shall be calibrated annually. If the lab performs the calibration internally, the torque wrench calibration equipment used shall be calibrated by a third-party calibration service.

7.3 Structural Welding (SI)

7.3.1 Equipment: Volt-Ammeter

Clamp-on volt-ammeters shall be calibrated every 12 months by the manufacturer, a third-party calibration service or verified in-house against a currently calibrated device. A written calibration or verification procedure is required if performed in-house or if a third-party service is used.

7.4 Nondestructive Testing (ST)

The laboratory shall maintain written procedures (written practice) for qualification and certification of nondestructive personnel conforming to ANSI/ASNT CP-189.

7.4.1 The laboratory shall maintain written method-specific procedures for all NDT methods performed conforming to AWS D1.1 and D1.8.

7.4.2 The written practice and method-specific procedures shall include the name and signature of both the NDT Level III administrator and the laboratory's Engineering Manager.

The certification record for NDT Level II technicians must include the following information:

- Be titled as a "Certification Record".
- Laboratory name, address and phone number.
- Name of individual certified.
- NDT methods.
- Level of certification (Level II minimum).
- Exam date.

- Recertification due date.
- Limitations (if any).
- Examination scores (%) for General/Specific/Practical and Average.
- Exam administered by (ASNT Certified Level III).
- Other certificates or qualifications (CWI, SCWI, etc.).
- Certification statement.
- Date of issuance.
- Signature and printed name of ASNT Certified Level III.
- Signature and printed name of laboratory's Engineering Manager.
- Visual acuity exam date and expiration date (required annually).

7.5 SFRM (SI)

7.5.1 Equipment

The laboratory shall have a thickness gauge and rectangular template conforming to requirements specified in ASTM E605.

REFERENCES:

2022 California Code of Regulations, Title 24.
Part 1: California Administrative Code (CAC)
Part 2: California Building Code (CBC)
ASTM E329–11 Agencies Engaged in Construction Inspection, Testing or Special Inspection