

CALIFORNIA DEPARTMENT OF TRANSPORTATION



**Independent Assurance Program
Annual Report
Calendar Year 2014**

**Division of Engineering Services
Materials Engineering and Testing Services
Transportation Laboratory
5900 Folsom Boulevard
Sacramento, CA 95819-4612**

Submitted by

Cathrina B. Barros

CATHRINA B. BARROS, Statewide Coordinator
Independent Assurance Program
Office of Roadway Materials Testing
Materials Engineering and Testing Services

Joseph F. Peterson

JOSEPH F. PETERSON, Chief
Office of Roadway Materials Testing
Materials Engineering and Testing Services

Prepared for

Division Administrator (HDA-CA)
California Division, Federal Highway Administration

California Department of Transportation Independent Assurance Program Annual Report Calendar Year 2014

1. OVERVIEW

1.1. INTRODUCTION

Title 23 of the *Code of Federal Regulations*, Chapter I, Part 637, Subpart B, Section 637.205(a) (23CFR637.205(a)), the Federal Highway Administration's (FHWA's) quality assurance procedures for construction require the following:

“Each STD [state transportation department] shall develop a quality assurance program which will assure that the materials and workmanship incorporated into each Federal aid highway construction project on the NHS [National Highway System] are in conformity with the requirements of the approved plans and specifications, including approved changes.”

Key components of this quality assurance program are “acceptance” and “independent assurance.” Independent Assurance (IA) programs may be project or system based. The California Department of Transportation (Caltrans) has chosen to implement a system based IA program.

Agencies choosing to implement a system based IA Program are required by 23CFR637.207(a)(2)(iv) to submit an annual report. In fulfillment of this requirement, this report is being submitted concerning activities of the Caltrans IA Program for calendar year 2014.

1.2. REPORT OVERVIEW

The Caltrans Independent Assurance (IA) Program provides a framework for assuring that the quality assurance program, as outlined in the Caltrans *Construction Manual* and in project specifications, is supported by qualified technicians and accredited laboratories. The Caltrans IA Program provides periodic evaluation of the performance of sampling and testing personnel, testing equipment, and testing laboratories.

The purpose of this document is to provide:

- A discussion of IA activities from January through December 2014
- 2014 Reference Sample Program (RSP) information
- Goals for the IA Program in 2015

1.3. SUMMARY OF ACTIVITIES: CALENDAR YEAR 2014

- **New IA Staff Certification** – Four new IA staff were certified by Materials Engineering and Testing Services (METS) in 2014.
- **District IA Staff Recertification** – METS IA staff recertified 35 district IA and local assistance IA staff.
- **The 2014 Annual IA Meeting** - The 2014 Annual IA Meeting was held on January 22, 2015.
- **District Process Reviews** - METS IA staff conducted IA process reviews in the 12 districts.
- **Technician Qualification** – METS IA staff, district IA and local assistance staff qualified a total of 2844 technicians in Caltrans, local agencies and commercial laboratories.
- **Laboratory Accreditation** - METS IA staff, district IA staff and local assistance IA staff accredited a total of 407 Caltrans, local agency and commercial laboratories.
- **Equipment Calibration by METS IA Staff** – METS IA staff calibrated large equipment in 11 Caltrans laboratories.
- **Reference Sample Program (RSP)** - The Reference Sample Program sent out samples for CT 309, “Method of Test for Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt” to 168 participating laboratories.
- **Local Assistance IA Staff** – Local Assistance IA staff reviewed 45 Quality Assurance Plans (QAP) for cities and counties in 2014.

2. CALTRANS INDEPENDENT ASSURANCE (IA) PROGRAM

2.1. BACKGROUND

Since 1992, Caltrans has been committed to an Independent Assurance program. Guidance for the program is outlined in the *Caltrans Independent Assurance Manual*, which is located at the following website address:

http://www.dot.ca.gov/hq/esc/Translab/ormt/IA_reports/2005_IA_Manual.pdf

In 1994, Caltrans shifted from a project based process for reviewing technicians, equipment, and results to a system based process. In the system based process, a technician's qualifications are ascertained by written examinations, witnessed performance of tests, and results of testing on split samples of materials for corroboration of test results. Caltrans IA staff reviews equipment and laboratories annually; and laboratories participate in a statewide proficiency sampling program. 23CFR63.207(a) provides that this approach removes the necessity of project specific samples.

Caltrans views independent assurance as an important and integral part of its quality assurance program, but separate from individual project quality assurance efforts. Independent assurance is implemented by METS. The Division of Construction ensures individual project quality assurance. Quality assurance at the project level is outlined in the *Construction Manual*, which is located at the following website address:

<http://www.dot.ca.gov/hq/construc/constmanual/>

In keeping with the requirements of the IA Program and 23CFR637, Section 6-305 of the *Construction Manual* instructs the construction engineer that:

“Field personnel who perform tests for compliance with the specifications must be qualified to conduct the proper tests methods as indicated by the contract.”

District	Accredited Laboratories																							
	Certified IA Staff				Number of Technicians Qualified				Caltrans				Local Agencies				Private Industry				Total			
	2014	2013	2012	2011	2014	2013	2012	2011	2014	2013	2012	2011	2014	2013	2012	2011	2014	2013	2012	2011	2014	2013	2012	2011
1	2	2	3	3	56	56	62	11	12	11	11	0	2	1	4	5	5	5	5	15	19	19	16	
2	4	4	4	4	158	158	153	8	8	8	8	1	1	1	14	15	15	15	15	23	24	24	24	
3	3	3	3	3	219	251	208	11	11	15	15	0	0	0	17	20	25	25	28	28	31	31	40	
4	5	5	4	4	301	264	347	8	8	8	8	0	0	0	22	21	17	17	30	29	29	25	25	
5	1	1	1	1	155	143	155	11	11	11	11	1	1	1	13	14	16	16	25	26	26	28	28	
6	3	3	3	3	224	239	224	5	5	6	6	0	2	2	27	26	29	29	32	33	33	37	37	
7	2	3	3	3	253	193	304	16	16	17	17	0	0	6	15	19	19	38	31	38	42	42	42	
8	3	2	2	2	475	386	351	2	8	6	6	0	1	1	42	28	31	44	44	44	37	38	38	
9	1	1	1	1	28	36	32	1	1	2	2	0	0	0	3	5	6	4	4	6	6	8	8	
10	2	2	2	2	208	215	219	6	6	5	5	0	0	0	15	17	16	21	21	23	23	21	21	
11	2	2	2	2	104	150	269	8	19	19	19	0	0	1	21	37	35	29	29	56	56	55	55	
12	2	2	2	2	253	145	266	5	3	4	4	0	1	1	25	26	30	30	30	30	30	35	35	
Total of all Districts	30	30	30	30	2434	2236	2590	92	108	112	112	2	8	14	225	229	244	319	345	369	369	369	369	
Total For HQ IA	1	1	1	1	15	32	40	0	0	0	0	0	1	2	2	3	5	2	4	4	7	7	7	
Total for Local Assistance IA	4	4	4	4	395	389	297	0	0	0	0	21	21	15	65	68	49	86	89	64	64	64	64	
Total for Districts and Headquarters	35	35	35	35	2844	2657	2927	92	108	112	112	23	30	31	292	300	298	407	438	440	440	440	440	

TABLE 1: IA PROGRAM DATA FOR 2014

3. CALTRANS IA PROGRAM IN 2014

Shown in Table 1 is a summary of certified Caltrans IA staff, qualified technicians, and accredited laboratories for 2014.

3.1. NEW INDEPENDENT ASSURANCE STAFF CERTIFICATION

Four new IA staff were certified in 2014.

3.2. ANNUAL RECERTIFICATION OF STATEWIDE IA STAFF

METS IA staff recertifies statewide IA staff on an annual basis. In 2014, METS IA staff recertified 35 district IA staff and Local Assistance IA staff. IA staff reviewed the following new test methods (formally lab procedures):

- CT 384, “Method of Test to Determine Combined Gradations for Hot Mix Asphalt (HMA) using up to 25% Reclaimed Asphalt Pavement (RAP)”
- CT 385, “Method of Test for Sampling and Testing Crumb Rubber Modifier”
- CT 386, “Method of Test for Determining Foaming Characteristics of Hot Bitumen”

Additionally, CA Portable Skid Tester certification was discussed.

3.3. 2014 INDEPENDENT ASSURANCE ANNUAL MEETING

The IA Annual Meeting was held on January 22, 2015. FHWA, METS, district IA staff, local assistance IA staff and District Materials Engineers were in attendance. Attendance by IA staff is mandatory for IA recertification.

The following topics were covered:

- Overview of IA program in 2014
- 2014 Reference Sample Program
- FHWA Updates
- CT 125 – Splitting Hot Mix Asphalt
- Local Assistance Update
- Implementation of new qualification programs in 2015
 - Inertial profiler operator certification
 - Gamma-gamma logging technician qualification
- CT 342 – CA portable skid tester demonstration
- District and Local Assistance IA issues

3.4. DISTRICT IA PROCESS REVIEWS

The *Caltrans Independent Assurance Manual* requires an annual process/peer review to verify district compliance with Caltrans policies regarding independent assurance. The review consists of an examination of IA documents, records and procedures. METS IA staff conducts the review of the district IA program implementation. These reviews are intended to promote statewide uniformity in the Caltrans IA Program.

IA files in the districts were reviewed by METS IA staff in 2014. In general, all districts have improved their filing systems. METS IA staff will continue to conduct process reviews in 2015.

3.5 LABORATORY ACCREDITATION

In 2014, statewide IA staff accredited a total of 407 Caltrans, local agency and commercial laboratories. This is a slight decrease from the 438 laboratories accredited in 2013.

3.5.1 LABORATORY ACCREDITATION, REVOCATION AND DISPUTE RESOLUTION

Section 2.5, “Dispute Resolution” of the *Caltrans Independent Assurance Manual* states:

“A tester or laboratory may have its entire qualification or accreditation or its qualification or accreditation for specific test methods suspended or revoked if it is found not to conform to IA accreditation requirements.”

In 2014, two laboratories had their accreditations revoked. Neither laboratory used the dispute resolution process.

3.6 TECHNICIAN QUALIFICATION

Statewide IA staff qualified a total of 2844 technicians in 2014. This is an increase from the 2657 technicians qualified in 2013.

3.6.1 TECHNICIAN DISQUALIFICATIONS

Eight technicians were disqualified by statewide IA staff due to improper test procedures. Four of these testers went through the dispute resolution process. The disqualifications were upheld.

3.7 CALTRANS LABORATORIES - EQUIPMENT AND CALIBRATION

Historically, a METS IA staff person calibrated all large Hveem related testing equipment in the district laboratories. This was to assure that all Caltrans’ large testing equipment was calibrated uniformly.

In 2014, METS IA staff calibrated large equipment in 11 Caltrans laboratories. With the move away from Hveem mix design, METS developed a calibration contract to deal with calibration of larger testing equipment in the district laboratories. This calibration contract was placed into service in September 2014.

For smaller equipment, IA staff is responsible for verifying the calibration of all testing equipment in accredited Caltrans laboratories. In some districts, IA staff is directly responsible for calibration of equipment in the district and field laboratories. In other districts, IA staff reviews the calibration records for district and field laboratories from private calibration services.

Overall, all calibration records are reviewed by IA staff, whether they are directly responsible for calibration of the equipment or not. To assist in uniformity of calibration practices, a separate Caltrans calibration manual will be available in 2015 detailing proper calibration procedures.

3.8 CALTRANS REFERENCE SAMPLE PROGRAM (RSP) IN 2014

The *Caltrans Independent Assurance Manual*, Section 2.4.4, “Proficiency Testing” states,

“The laboratory shall participate in all required proficiency sample programs to be accredited.”

It is the laboratory’s responsibility to maintain active status in proficiency testing of reference samples by testing and reporting the results. Reference sample results are evaluated using a statistical evaluation system for determining the numerical ratings of each test method as detailed in the *Caltrans Independent Assurance Manual*.

In 2014, samples for CT 309, “Method of Test for Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt” were distributed to 168 participating laboratories (126 private, 33 Caltrans and 9 local agencies). After the initial round of testing, 5 laboratories submitted results that were considered unacceptable. All 5 laboratories had acceptable results after the second round of testing.

The report for the CT 309 is being finalized and will be placed on the website upon completion.

3.8.1 GOALS FOR THE RSP IN 2015

The following table gives an approximate timeline for the 2015 RSP sample distribution:

2015	Test Method
January – April	Fine Gradation/Sand Equivalent
May – August	Cleanness Value
September – December	Hamburg Wheel Tracking Test

TABLE 2: PROPOSED RSP SAMPLES FOR 2015

3.9 LOCAL ASSISTANCE INDEPENDENT ASSURANCE PROGRAM

Chapter 16, Section 16.14, “Quality Assurance Program,” of the *Caltrans Local Assistance Procedures Manual*, states “local agencies must follow Caltrans Quality Assurance Procedures (QAP) for all projects on the NHS”. Therefore, for local agency projects on the NHS, Caltrans IA staff is responsible for providing IA services to local agencies.

Five local assistance IA staff positions were filled in December 2008. Implementation of the Local Assistance IA program began in March 2009. Local Assistance IA staff interacts on a regular basis with the district local assistance engineer (DLAE).

The accreditation statistics for the Local Assistance IA staff are found on Table 1. In addition to providing IA services, the Local Assistance IA staff review local agency Quality Assurance Program (QAP) manuals for compliance with Caltrans Local Assistance requirements. In 2014, 45 local agency QAP manuals were reviewed by Local Assistance IA staff.

4.0 CALTRANS INDEPENDENT ASSURANCE HIGHLIGHTS FOR 2014

4.1 INDEPENDENT ASSURANCE MANUAL REVISIONS

The *Caltrans Independent Assurance Manual* revisions are completed and an updated manual will be released in 2015. The highlights of the main changes are as follows:

- Clarification on materials covered by the Independent Assurance Program
- Plain language for consistency with Caltrans recent specification revisions
- Two year qualification period for testers
- Use of internet for access to the *Caltrans Independent Assurance Manual* and supporting documents, eg, QA-related references, glossary, appendices, forms, etc.

4.2 AASHTO ACCREDITATION OF CALTRANS DISTRICT MATERIALS LABORATORIES

In the past, the main Transportation Laboratory in Sacramento was accredited by AMRL and CCRL, and the district laboratories were under the umbrella of the Sacramento accreditation. Caltrans is moving towards having all district and regional laboratories receive AASHTO accreditation. In 2014, the District 1, 5 and 10 laboratories received AASHTO accreditation.

In 2015, Districts 4 and 9 will continue the AASHTO accreditation process. At present, 7 of the 10 district/regional laboratories have received AASHTO accreditation.

4.3 NEW CERTIFICATION PROGRAMS IN 2014

4.3.1 INERTIAL PROFILER

Caltrans has an on-going need to implement certification programs for new Caltrans test methods and testing programs. CTM 387, “Operation, Calibration and Operator Certification of Inertial Profilers” was developed by the Caltrans Pavement Program to measure roadway profiles for acceptance and verification on projects to ensure pavement smoothness. This certification program follows the Caltrans IA program, but due to the specialized nature of the testing, witnessing and calibration, the certification program is handled by METS IA Staff in ORMT at Translab.

The IP operator certification program is a two-day process which consists of the following:

Day One

The candidate attends a two-hour classroom session. Upon completion of the classroom session, a training certificate is issued to attendees. After training, a 20-question written exam based on CT 387 is administered. The candidate must receive a minimum score of 70% to pass the exam.

Day Two

The calibration program is administered by the University of California Pavement Research Center (UCPRC). The equipment calibration procedures are demonstrated by the candidate at the UCPRC calibration site located in Sacramento.

The following calibration procedures are demonstrated by the candidate:

- Block test (laser test)
- Bounce test (accelerometer test)
- DMI (Distance Measuring Instrument)

The IP operator certification process is observed by METS IA staff, and profile data collected is analyzed and compared to reference data to evaluate repeatability and reproducibility.

Inertial profilers passing the calibration tests are issued a decal for the equipment. The decal is valid for 12 months.

Candidates that successfully pass the written exam and successfully demonstrate calibration procedures are issued certification letters and a profiler operator certification identification card. The equipment operator certification is tied to the specific inertial profiler equipment brand used during the calibration procedure demonstration. The equipment operator certification is valid for 12 months.

Candidates that are unsuccessful in passing the written exam must adhere to the retest waiting periods detailed in Section 2.3.2, “Tester Qualification Procedures” in the *Caltrans Independent Assurance Manual*. Candidates unsuccessful in proper demonstration of the calibration procedures must wait until the next scheduled certification session to perform the calibration procedures again.

In 2014, MET IA staff certified 24 inertial profiler units and 71 equipment operators.

4.3.2 CT 233: GAMMA-GAMMA TEST METHOD

The CTM 233, “Method of Ascertaining the Homogeneity of Concrete in Cast-In-Drilled-Hole (CIDH) Piles using the Gamma-Gamma Test Method” certification program was requested by the Office of Geotechnical Support. Laboratory accreditation and tester qualification follows the Caltrans IA program, but due to the specialized nature of the testing, the accreditation and tester qualification is handled by METS IA Staff in ORMT.

The tester must pass a 15-question written exam based on CT 233. A minimum score of 70% must be obtained to pass the written exam.

Upon successful completion of the written exam, the tester must demonstrate proficiency through a practical evaluation conducted by METS IA staff. A TL-0111 and TL-0113 is issued by METS IA staff. If the laboratory holds current accreditation in other test methods issued by statewide IA staff, a copy of the TL-0111 will be provided to the IA staff that issued the original laboratory accreditation.

Candidates that are unsuccessful in passing the written exam and practical exam must adhere to the retest waiting periods detailed in Section 2.3.2, “Tester Qualification Procedures” in the *Caltrans Independent Assurance Manual*.

In 2014, METS IA staff accredited 4 laboratories and qualified 14 testers in CT 233.

4.3.3 CA PORTABLE SKID OPERATOR CERTIFICATION PROGRAM

California developed the California (CA) Portable Skid Tester to measure skid resistance in the late 1950’s. It is a unique California test method that measures pavement micro and macro texture and has no national standard test method equivalents. The existing equipment was designed, built and maintained by Caltrans and was commercially unavailable. Generally, skid testing is performed by Caltrans staff so the need for private laboratory accreditation in CT 342 was uncommon.

The Office of Roadway Materials Testing (ORMT) has developed a set of working drawings for the CA portable skid tester machine. Availability of these drawings will enable private testing laboratories to build a machine and request CA Portable Skid Tester Operator certification. The certification will follow the processes detailed in the *Caltrans Independent Assurance Manual*, but due to the specialized nature of the testing, the certification process is handled by ORMT staff at Translab.

Prior to operator qualification, the CA portable skid tester machine will be calibrated and certified through the ORMT at Translab. Once the machine is calibrated and certified, a calibration sticker will be placed on the machine.

Calibration stickers are valid for 12 months. The machine information will be recorded and kept on file at Translab.

CA portable skid tester operator qualification will be handled by the METS IA staff. A written exam with 25 questions based on the content of CT 114 and CT 342 will be administered to the candidate. A minimum score of 70% is required to pass the written exam.

Upon successful completion of the written exam, a practical exam will be administered by METS IA staff. The candidate will perform the practical exam on a testing machine that has been calibrated and certified through Translab. The equipment operator certification is tied to the specific CA portable skid tester machine used during the practical exam.

Candidates that successfully pass the written exam and practical exam are issued a TL-0111 and a CA portable skid tester identification card. The CA portable skid tester operator certification is valid for 12 months.

Candidates that are unsuccessful in passing the written exam and practical exam must adhere to the retest waiting periods detailed in Section 2.3.2, “Tester Qualification Procedures” in the *Caltrans Independent Assurance Manual*.

5.0 CALTRANS INDEPENDENT ASSURANCE GOALS FOR 2015

The METS IA Program staff will be working on the following endeavors in 2015:

- Completion of the Caltrans Calibration Manual
- Update written exams for CT and AASHTO test methods
- Implementation of the CA Portable Skid Test Certification Program