



TxDOT Quality Assurance Program (QAP)

Alternative Delivery Program



Rev. 01
Released: 11/20/2024

TxDOT quality assurance program (QAP)

This is a self-directed overview of Design-Build contracting based on the Quality Assurance Program for CDA / Design-Build Projects document dated Aug 2, 2024.

The object shown below on a slide provides reference to the Section of the Programmatic Documents

Sample

 **Contract Reference:**
QAP Section XXX



Quality Assurance Program for CDA/Design-Build Projects

August 2, 2024

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TxDOT quality assurance program (DB QAP)



Training Goals:

1. Provide an overview of TxDOT's DB QAP.
2. Review the purpose and key components of the TxDOT DB QAP.
3. Understand the TxDOT DB QAP's quality organizational roles and responsibilities.
4. Learn more about the auditing, record keeping, and reporting requirements.

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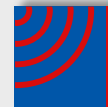
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1 DB QAP Overview

TxDOT DB QAP

Purpose



★ *Contract Reference:
DB QAP, Sec. 1.1*



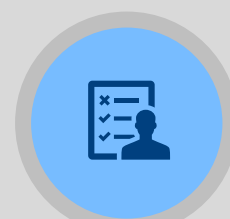
Meets the criteria in **23 CFR 637.207** for developing a quality assurance program for Federal-aid highway construction projects on the NHS.



Ensures that materials and workmanship incorporated into the highway construction project are in reasonable conformance with the approved plans and specifications.



Provides statewide consistency and a programmatic approach for DB projects where DB Contractor's test results are used in the acceptance decision.

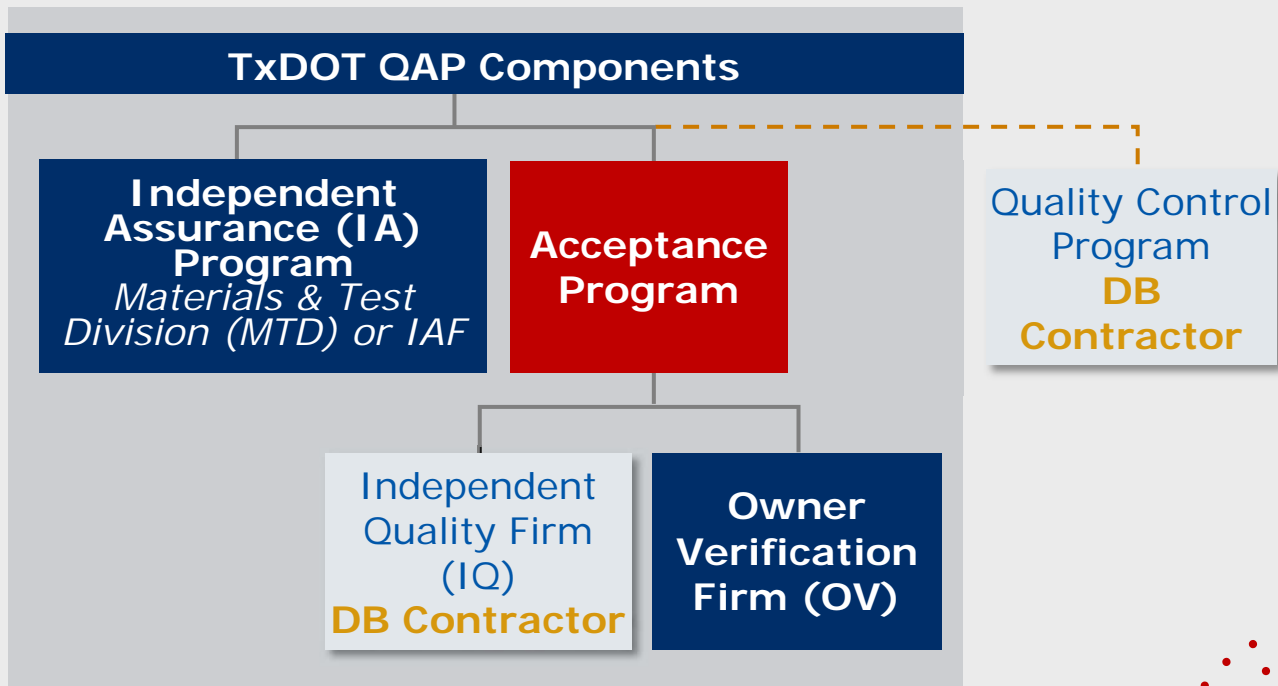


Allows for the use of DB Contractor-performed Independent Quality Firm's (IQ) test results as part of an acceptance decision only if the IQ's results are verified by the Owner Verification (OV) testing results performed by TxDOT.



Requires review and approval by TxDOT and FHWA 90 days before construction starts if any project-specific modifications are made.

TxDOT DB QAP Components and Relationships



▪ The TxDOT DB QAP consists of 3 Component Programs

- Quality Control by DB Contractor.
- Acceptance by IOF and OV.
- Independent Assurance by MTD or IAF.

Legend:

TxDOT/GEC Oversight

DB Contractor

The TxDOT DB QAP is a system of connected activities and requirements intended to assure the quality of construction.



Quality Assurance Organization Roles and Responsibilities



U.S. Department of Transportation
Federal Highway Administration

- Federal Sampling and Testing Requirements.
- Federal Oversight & Quarterly Audits.
- Approval of TxDOT Quality Assurance Program (QAP).



- Develop Quality Assurance Program (QAP) Requirements.
- Owner Verification Sampling, Testing and Inspection Plan and execution (OVTI).
- Independent Assurance (IA).
- State Oversight & Auditing.

DB Contractor

- Quality Management Plan
- Construction Quality Control
 - Processes and testing to assure work is per contract and CQMP.
- Construction Quality Assurance
 - Independent sampling, testing, inspection and monitoring for CQMP compliance.

Quality Assurance Reference Documents

FHWA

23 CFR 637 Part B

Quality Assurance Procedures for Construction

FHWA Technical Advisory T 6120.3

“Use of Contractor Test Results in the Acceptance Decision, Recommended Quality Measures, and the Identification of Contractor/Department Risks”

FHWA Publication No. FHWA-HRT-12-039

“Construction Quality Assurance for Design Build Highway Projects”



TxDOT

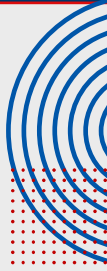
Guide Schedule for Sampling and Testing

Quality Assurance Program for CDA / Design Build Projects

Programmatic Documents including DB GC Item 4, Attachments 4-1 and 4-2, and DBS Attachment 27-2



TxDOT QAP Comparison for DB and DBB



Design-Build

Owner and DB Contractor jointly-controlled Construction Quality Acceptance

Quality Control	Acceptance Program		Independent Assurance (IA)
	IQ Sampling and Testing	Owner Verification	
DB Contractor & Subcontractors	DB Contractor's Independent Quality Firm (IQ)	TxDOT's Independent OVT Firm (OV)	TxDOT District Lab or Designated IA Lab

Design-Bid-Build

Owner Controlled Construction Quality Acceptance

Quality Control	Quality Acceptance	Owner Verification	Independent Assurance (IA)
Contractor & Subcontractors	TxDOT District	N/A	TxDOT (MTD and District Laboratory)



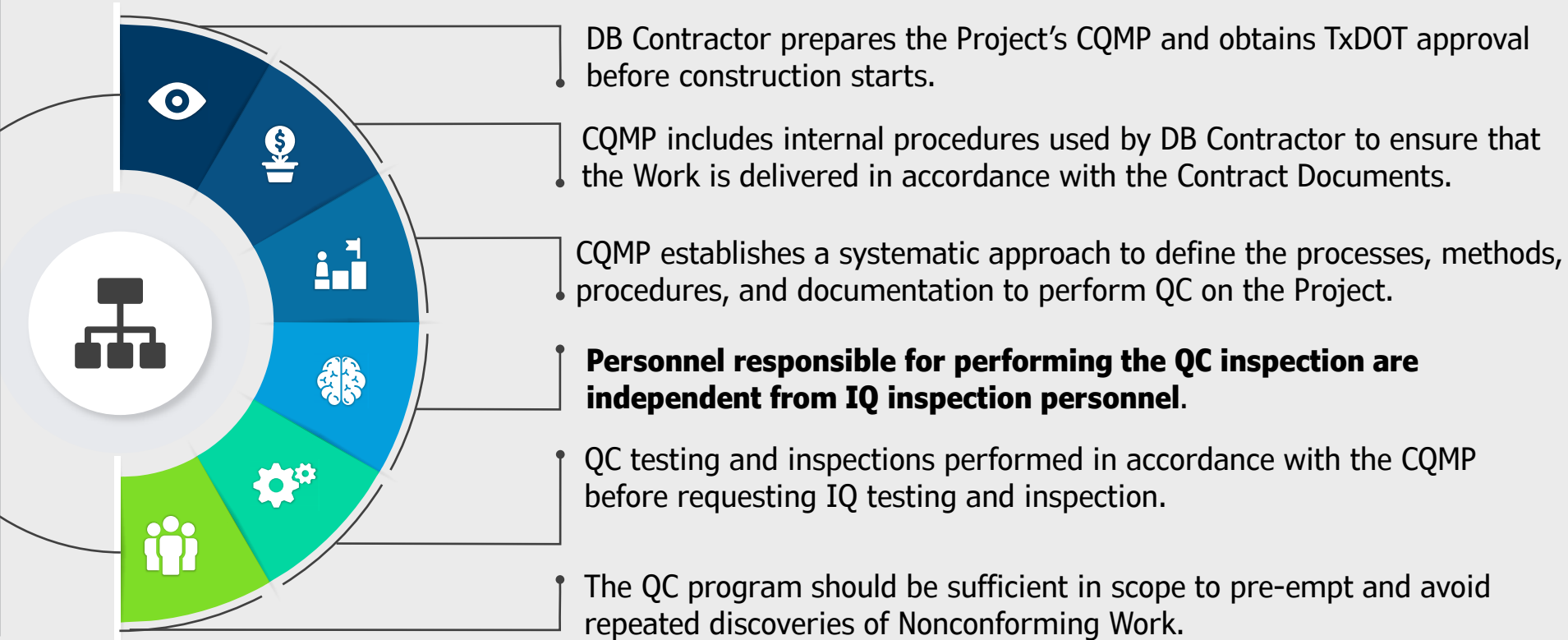


2 DB Contractor QC Program

DB Contractor QC Program



★ *Contract Reference:
DB QAP, Sec. 2*



Quality Control Staffing



★ *Contract Reference:
DB QAP, Sec. 2.2.1*

Construction Quality Control Manager (CQCM)

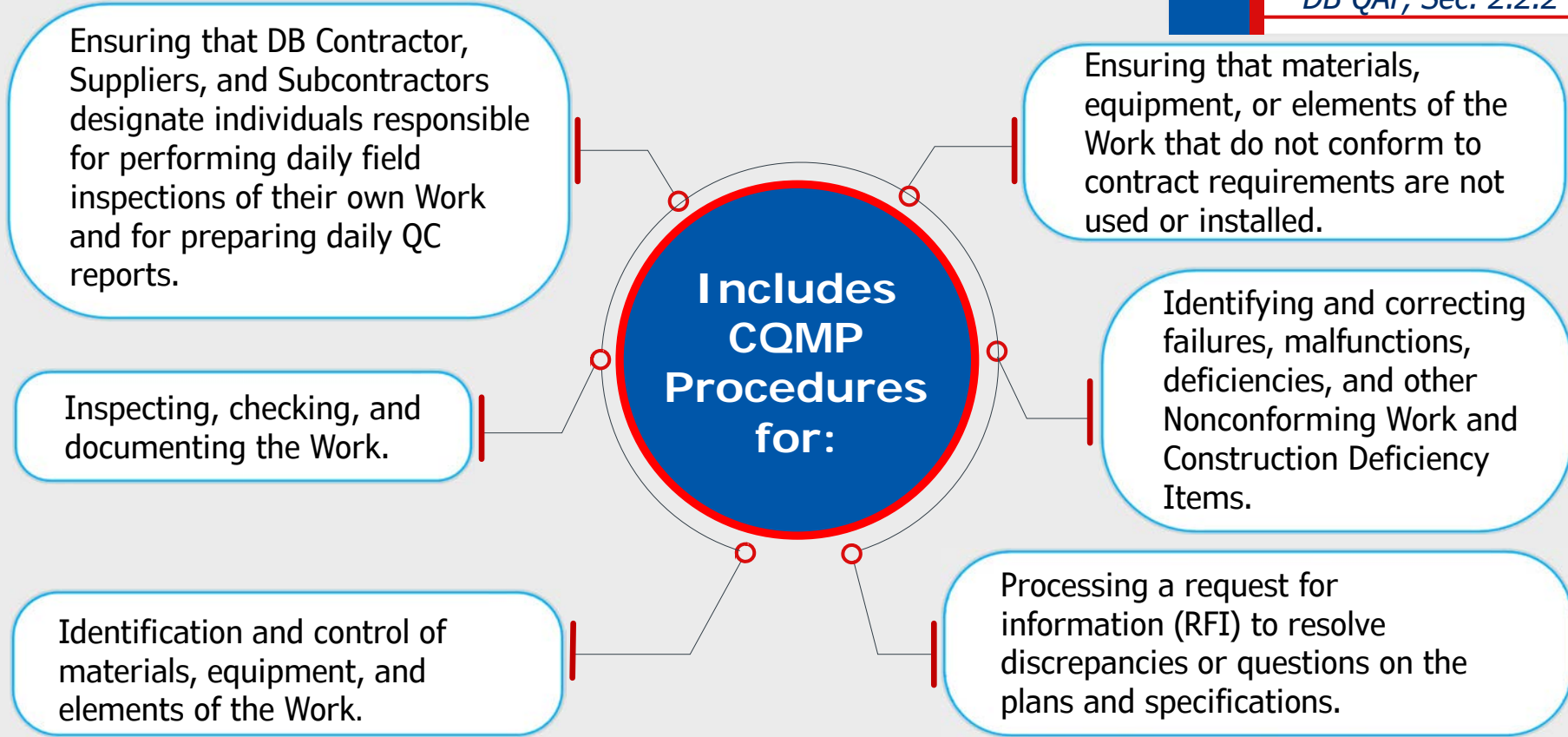
- Responsible for ensuring that the methods and procedures contained in the approved CQMP are implemented and followed by the DB Contractor and Subcontractors in the performance of the Work.
- **Not involved with scheduling or production activities.**
- Must have a minimum of 10 years of experience on projects of similar complexity.

Other QC Staff

- DB Contractor's and Subcontractor's construction workforce are all considered to be members of DB Contractor's QC staff.
- Be knowledgeable in their duties and receive documented training.
- Independent from IQF personnel.
- Personnel performing QC sampling and testing are knowledgeable in the testing methods and procedures.
- **IQF personnel do not perform duties on behalf of QC personnel.**



★ *Contract Reference:
DB QAP, Sec. 2.2.2*



★ *Contract Reference:
DB QAP, Sec. 2.2.3*

Reporting, Record Keeping, and Documentation

The CQMP includes procedures to ensure:

- Retention of construction quality records of all inspections and tests, including
 - Factual evidence that the required inspections or tests have been performed;
 - Results of inspections or tests;
 - Nature of defects, deviations, causes for rejection, etc.;
 - Proposed remedial action; and
 - Corrective actions taken.

QC test results are evaluated by the CQCM and test requirements are satisfied prior to requesting IQF testing and inspection.

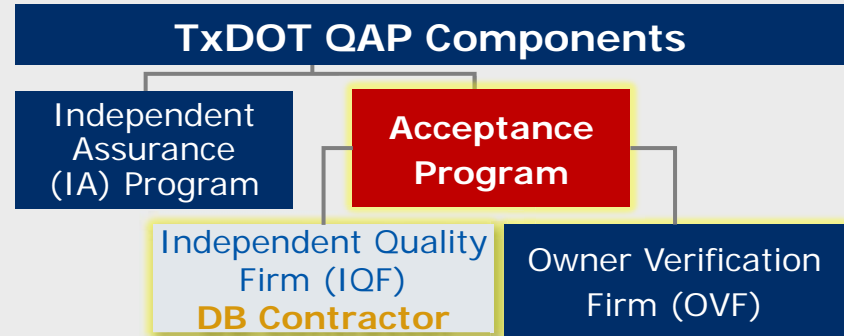
QC inspection reports, process control material sampling/testing results, and control charts (every subplot/mix) are reported **within 48 hours following the inspection or test** and readily available for IQF and TxDOT review or audit.



3 Acceptance Program

★ *Contract Reference: DB QAP Sec. 3.4, and Appendix A*
Contract Reference: DBA GC, Section 1.2.2

Definitions



Acceptance Program




All factors that comprise TxDOT’s determination of the quality of the Work as specified in the contract requirements.

Independent Quality Firm IQF



The independent firm responsible for managing the quality assurance program for the Construction Work and performing independent quality assurance material testing, inspection, and audits of the CQMP.

Owner Verification (OV)




The inspection and testing by the OV firm to verify and validate the suitability of the IQF inspection and testing results for acceptance of Work.

Risk-Based Inspection




A prioritizing and planning tool used by the OVF where elements of Work are identified for inspection based on their associated risk of failure.

Acceptance Program


 DB Contractor's CQMP includes the internal procedures used by the IQF to ensure that the Work is inspected and tested to verify compliance with the Contract Documents.



 **Both the IQF's and OVF's testing, and inspection results together are the basis for the acceptance decision.**

 TxDOT's OV program includes internal procedures used by TxDOT or its designee to ensure that the DB Contractor's IQF program is performed in accordance with the approved CQMP and to verify IQF testing and inspection.



 **IQF testing results may be used for acceptance when they are statistically validated or verified by the OVF testing results.** IQ activities are performed by the IQF and OV is performed by TxDOT or its designee.

 **Contract Reference:**
DB QAP, Sec. 3.1

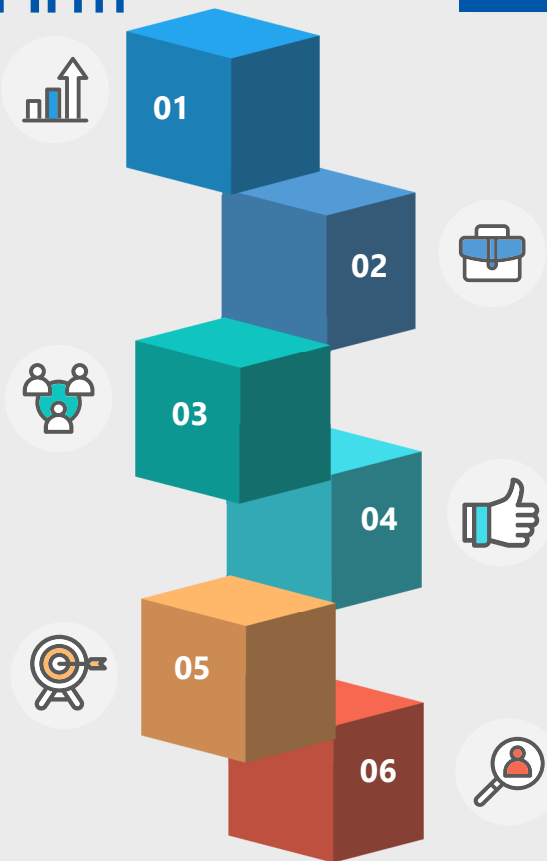
The OVF will implement a risk-based process for Owner Verification Inspection (OVI) for use in the acceptance decision.

Acceptance Program - Independent Quality Firm

The IQF is part of the DB Contractor organization and reports jointly to DB Contractor's management team and TxDOT.

The DB Contractor's CQMP includes the internal procedures used by the IQF to ensure that the Work is inspected and tested to verify compliance with the Contract Documents.

The IQF will use a laboratory meeting the requirements of the contract documents and the Independent Assurance Program.



 **Contract Reference: DB QAP, Sec. 3.5**

DB Contractor's IQF will assign an on-site Independent Quality Firm Manager (IQM), responsible for management of the quality aspect of the DB Contractor's CQMP.

The size of the IQF's staff will reflect the volume of activities necessary for acceptance of the work in progress.

The IQF will continuously track, and record quantities of materials incorporated into the Project.

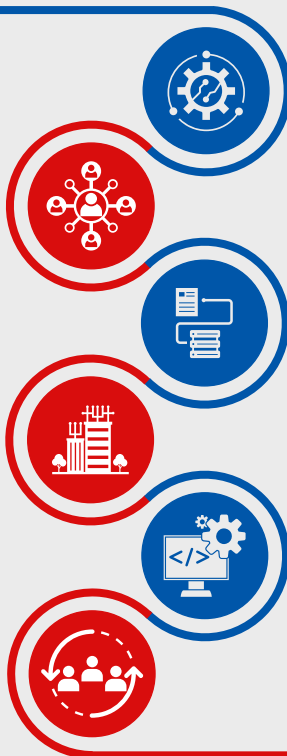
Acceptance Program - Owner Verification Firm

 *Contract Reference: DB QAP, Sec. 3.6*

TxDOT's Risk-Based Owner Verification Testing and Inspection Plan (OVTIP) will describe TxDOT's commitments to perform owner verification (OV) of the DB Contractor's IQ testing and inspection.

The OVTIP includes the methods, procedures and systems used by the OVF staff to verify the DB Contractor's compliance with the approved CQMP and the Contract Documents.

The OVTIP must be approved before construction starts.



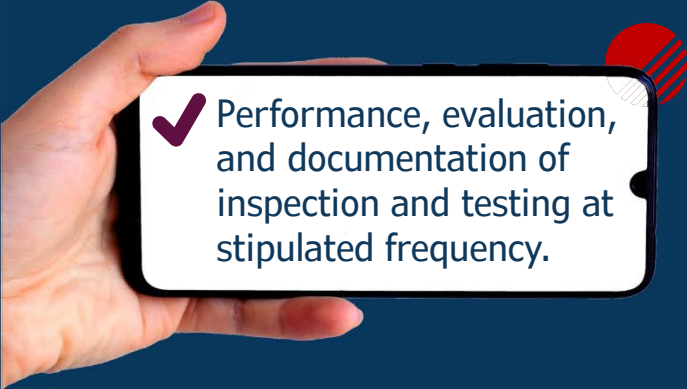
TxDOT (or its designated OV agent) will perform Owner Verification sampling, testing, and inspection, and conduct audits to verify the DB Contractor's compliance with the approved CQMP.

TxDOT will submit OV Reports on a quarterly basis to FHWA for concurrence of TxDOT's compliance with the approved QAP.

TxDOT's OV laboratory will meet the requirements of the Independent Assurance Program.

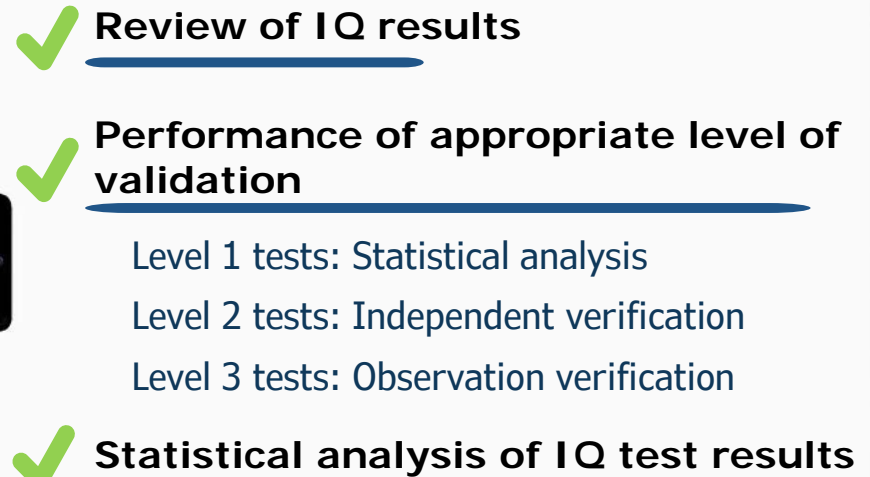
Acceptance of Work by both IQF and OVF

Independent Quality (IQ)

- 
- ✓ Performance, evaluation, and documentation of inspection and testing at stipulated frequency.

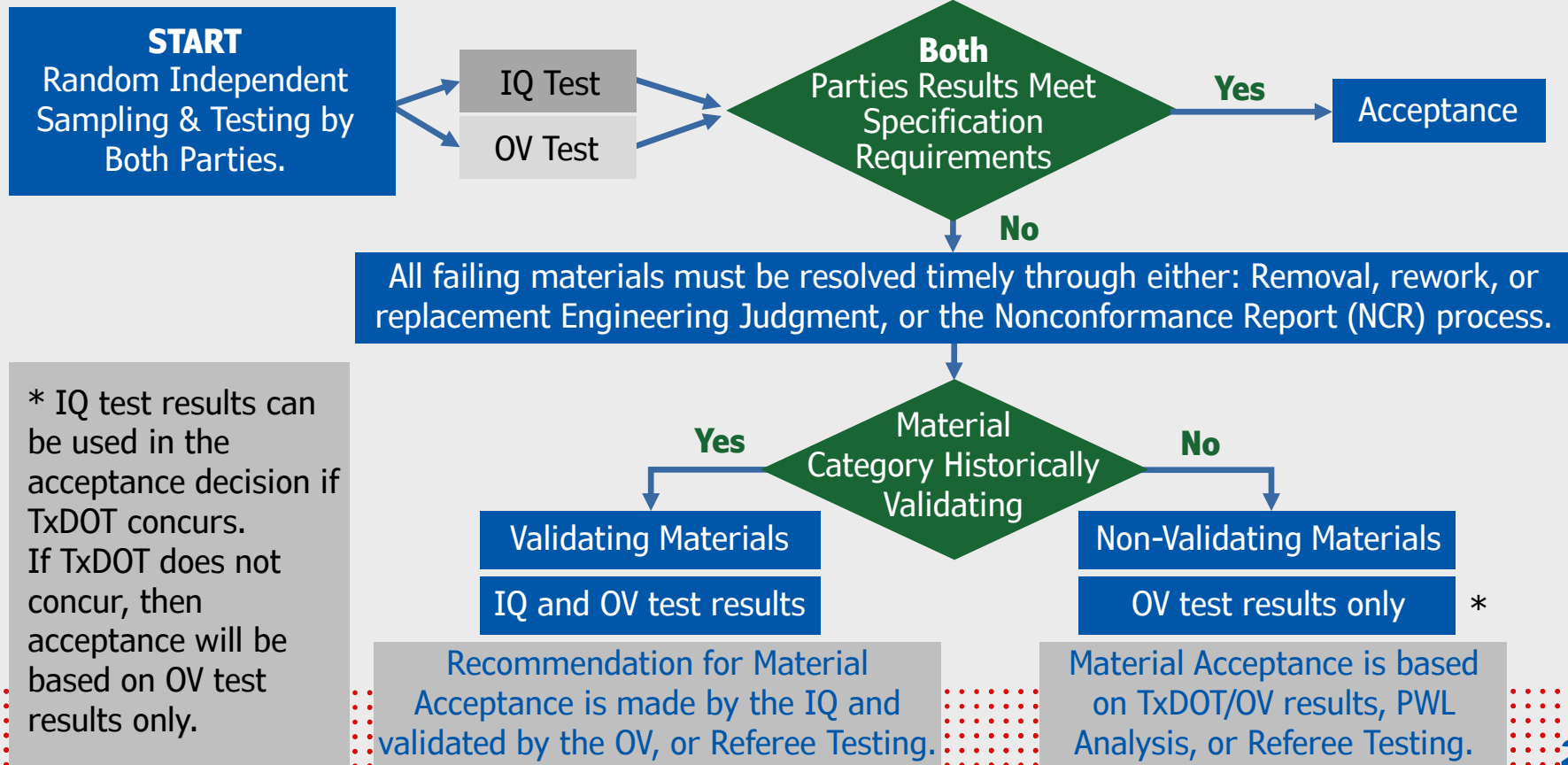
Engineering Judgment and Referee Testing may be used for Acceptance if needed.

Owner Verification (OV) TxDOT District or Designee

- 
- ✓ Review of IQ results
 - ✓ Performance of appropriate level of validation
 - Level 1 tests: Statistical analysis
 - Level 2 tests: Independent verification
 - Level 3 tests: Observation verification
 - ✓ Statistical analysis of IQ test results

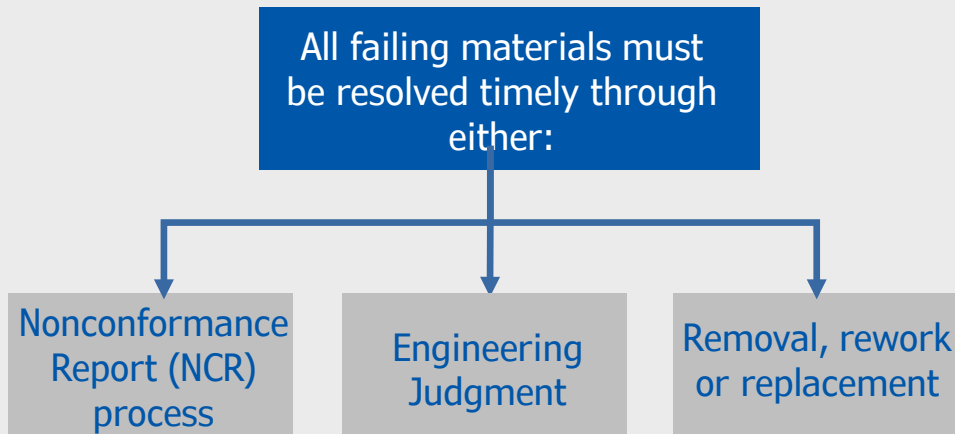


Material Quality Acceptance Workflow



* IQ test results can be used in the acceptance decision if TxDOT concurs. If TxDOT does not concur, then acceptance will be based on OV test results only.

Acceptance of Failing Materials



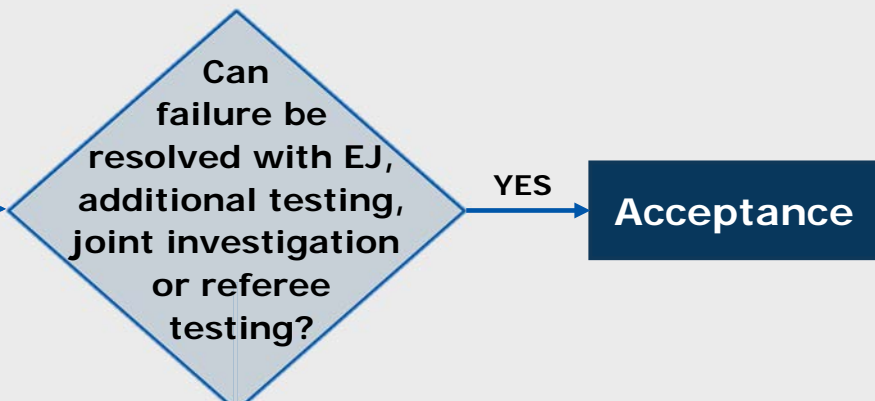
★ *Contract Reference: DB QAP, Sec. 3.6.3.4*

★ *Refer to the training "Acceptance Program" for more information on material quality acceptance process.*

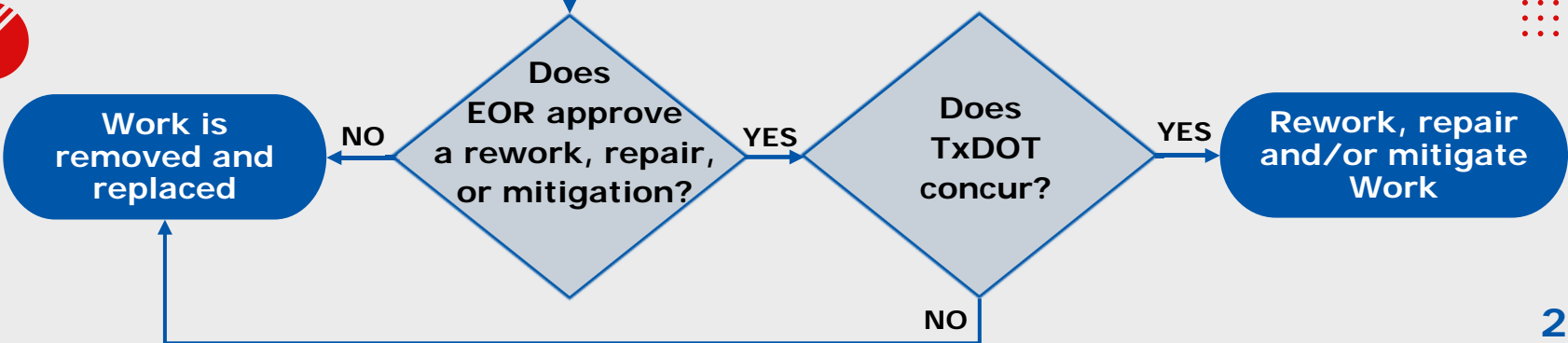
- NCRs must be reviewed and approved by the Engineer of Record (EOR).
- CDRs are used for workmanship deficiencies that do not require an engineering decision by the EOR.
- CDRs can be used for Work features that can be re-worked in the field to comply with the original requirements.
- CDR example includes re-working earthwork and re tying steel.
- **CDRs cannot be used to address and accept materials with failing testing results.**

Nonconforming Materials

Material Test Fails



NCR is initiated



★ Refer to the training “Deficient and Nonconforming Work” for more information on the NCR process.

Engineering Judgment



★ *Contract Reference:
DB QAP, Sec. 3.6.3.3*

Engineering Judgment (EJ)

Determination as to whether a material failing to meet specification requirements and not within applicable tolerances should be accepted, or not accepted.

TxDOT allows the IQ to exercise EJ

IQ Agrees to Exercise EJ

IQ Does not Agree to Exercise EJ

- Notify TxDOT of EJ within 24 hours.
- EJs decisions shall be made as soon as test results are available.
- Document in the EJ log within 7 days.
- Submit the EJ log to TxDOT monthly.

- The failing materials or work may still be accepted through the NCR process
 - Repaired if approved.
 - Brought into conformance with specifications.
 - Removed and Replaced.



Contract Reference: DB QAP, Sec. 3.7.6


Independent Quality Firm (IQ) may request TxDOT initiate Referee Testing.

TxDOT will approve or reject the request to perform Referee Testing.

Referee Testing is solely a TxDOT function, therefore a 3rd Party laboratory cannot be hired by the DB Contractor.

Referee Testing

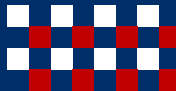
A process to resolve disputes over differing test results between the IQ and the OV in a reliable, unbiased manner by testing and evaluation performed by a referee laboratory.



The referee laboratory is TxDOT's Materials and Testing Division (MTD) central laboratory, or a qualified independent 3rd party testing laboratory approved by MTD.

Test results are signed and sealed by a licensed professional engineer registered in Texas.

The referee laboratory's decision is FINAL.





5 Independent Assurance Program

★ Contract Reference: DB QAP,
Sec. 4.1 and 4.2

Independent Assurance Program

The IA program evaluates as part of the acceptance decision:

- All sampling and testing procedures
- Personnel
- Equipment



TxDOT (or its designated IA agent) will implement the IA Program.

Independent Assurance Quality Plan (IAQP):

- TxDOT (or its designated IA agent) develops the IAQP.
- The IAQP must be submitted to TxDOT MTD and approved before construction starts.

The IAQP contains, at minimum, how IA staff will address methods and procedures that clearly define the administration of the IA program.

TxDOT's IA laboratory will meet the requirements of the Independent Assurance Program.

TxDOT MTD will compose and submit an annual report to the FHWA Division Administrator summarizing the results of TxDOT's systems approach IA program.



Contract Reference:
DB QAP, Sec. 4.3


Personnel Qualifications



Require Certification

Sampling and testing personnel must obtain and keep current the following certifications unless otherwise waived by governing specifications:

- ACI Certification.
- Hot-Mix Asphalt Center (HMAC) Certification Levels.
- TxDOT Qualification—Concrete Mix Design Review/Approval.
- Any other project-specific test certifications as required per the specifications, applicable DMS, or material quality program.



Qualification Procedure for IQF, OVF, and IA Personnel

- Any individual who performs tests on materials for acceptance must be qualified in the areas of hydraulic cement concrete, soils and aggregates, and bituminous materials.
- Performance test: An individual must successfully perform the specific test and the necessary calculations.
- Written test: An individual must pass a written examination (minimum score of 80%) administered by an authorized evaluator.
- **Except for ACI Certification which is valid for 5 years, qualification of an individual is valid for not more than 3 years after which the individual must be re-qualified.**



Contract Reference:
DB QAP, Sec. 4.4

Laboratory Qualifications



Laboratory Qualification Responsibility

- Laboratories where IA, IQF, and OVF tests will be performed must be qualified.
- The TxDOT MTD central laboratory will be accredited by one of the following:
 - AASHTO CCRL
 - CMEC
 - L-A-B
- TxDOT MTD is responsible for overseeing the statewide laboratory qualification program and for qualifying the IA laboratory.



Laboratories to be Qualified

All laboratories performing testing for TxDOT require qualification. These include:

- A. TxDOT MTD central laboratory;
- B. TxDOT MTD field laboratories;
- C. IAF laboratory;
- D. Referee laboratory;
- E. IQF laboratory; and
- F. OVF laboratory.



Qualification Process

- The laboratory qualifying authority conducts Quality System Inspection – Commercial Laboratory.
- The IA laboratory issues a certificate of accreditation for each IQF's and OVF's project laboratory after performing the required laboratory qualifications.
- The IA laboratory performs an audit follow-up every 12 months or more frequently as needed with prior approval by TxDOT) for the remaining duration of the project.



6 Audits, Record Keeping, and Reporting

TxDOT DB QAP

★ Contract Reference: DB QAP,
Sec. 3.5 and 3.6

IQF's Audits

- **Audits must be performed at least twice a year.**
- Compliance with CQMP.
- Compliance with BABA requirements.
- Supplier fabrication plant(s).
- Materials delivered to the project site.
- Example of other audited activities:
 - Sampling and testing.
 - Inspection reports.
 - Non-conformance resolution.

OVF's Audits

- **Audits must be performed at least once a year.**
- Compliance of QC and IQF activities with Contract Documents and CQMP.
- Fabrication plant(s).
- Compliance with BABA requirements.

TxDOT or its agent performs planned and periodic audits of the OV firm to determine adherence to and the effectiveness of the OVTIP.

DB QAP Record Keeping

DB Contractor



- DB Contractor maintains construction workmanship and materials quality records of all inspections and tests performed per the approved CQMP
- These records will include:
 - Factual evidence that the required inspections or tests have been performed.
 - Type and number of inspections or tests involved.
 - Results of inspections or tests.
 - Nature of defects, deviations, causes for rejection, etc.
 - Proposed remedial action.
 - Corrective actions taken.
- The records cover:
 - Conforming work.
 - Deficient and Nonconforming Work.
- The records will include a statement that all supplies and materials incorporated in the Work are in full compliance with the terms of the Contract Documents.
- The records to be furnished to TxDOT in an electronic format specified in the CQMP.



★ *Contract Reference: DB QAP, Sec. 2.2.3, 3.5.6.*

IQF



If the IQF inspection and testing source documents are paper and then changed to an electronic document for project-level use

The original source paper document must be kept for 3 years after FHWA final voucher on the project and as detailed in the State of Texas Records Retention Schedule.



TxDOT QAP Reporting Requirements

On-going Reporting

- QC inspection reports, process control material sampling or testing results, and control charts will be reported within 48 hours following the inspection.
- DB Contractor's IQF maintains electronically and transmit to TxDOT daily inspection reports within 48 hours after the work shift.
- Materials Test Results (IQ).
- Owner Verification reporting (OVTF).
- Construction deficiency and Non-conformance Reports.



★ *Contract Reference: DB QAP, Sec. 2.2.3, 3.5.6 and 3.6.3*

Final Reporting

- Final OV Report.
- Final Material Certification Letter.

Periodic Reporting

- IQF Monthly Certification (Construction/Materials).
- IQF monthly materials quantities report.
- OV Quarterly Report
 - Level 1, 2, and 3 verification results.
 - Split-sample test results.
 - Approved project-specific Levels of Analysis
 - Non-validation investigations.
 - Nonconformance and Engineering Judgment Logs.
 - Construction Certifications.
- Audit reports.
- IA Lab Annual Report.



7 Takeaways and Reference Documents

TxDOT QAP



Get the Independent Assurance Firm out as soon as possible, sometimes hard to schedule.



Begin the material testing validation process early.



Agree early on the list of agreed-upon terms (controlled vocabulary list) used to identify each IQF and OV testing report.



Check validation on a daily basis.



Co-location of QA and OV is crucial



Focus QC program to prevent excessive nonconformances, CDRs and NCRs, and excessive use of EJ.

Take Aways

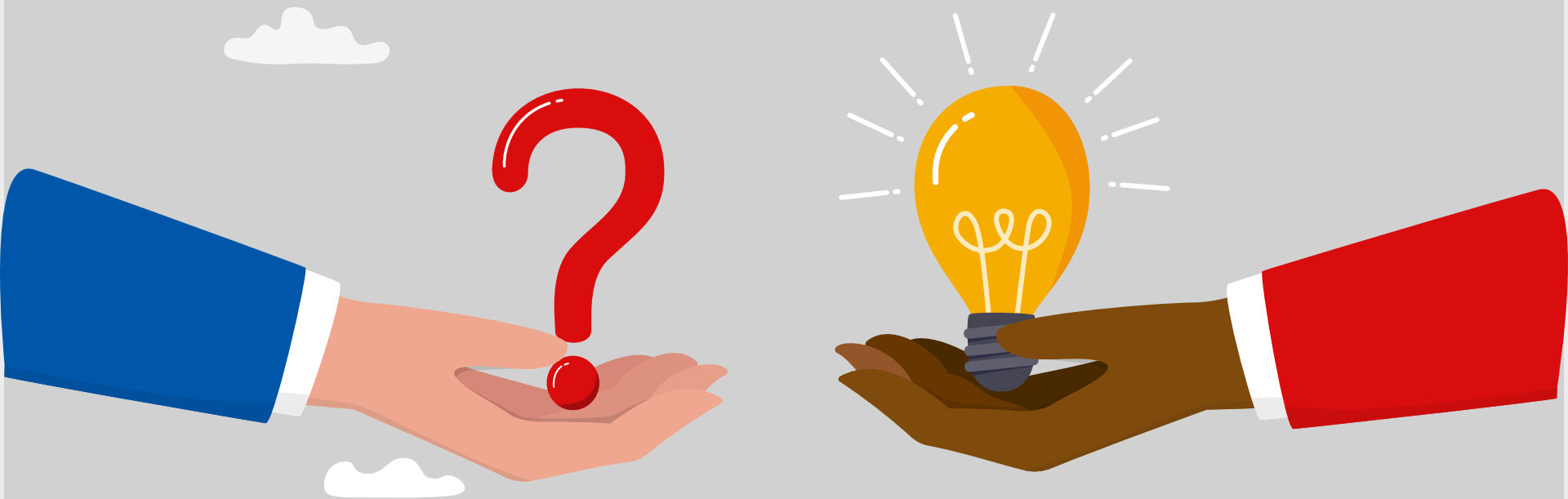
TxDOT QAP

References

- Quality Assurance Program for CDA/Design-Build Projects
- Stewardship & Oversight Report – FY 2015



Questions & Discussion





HELP #EndTheStreakTX

End the streak of daily deaths on Texas roadways.

TxDOT.gov (Keyword: #EndTheStreakTX)



#EndTheStreakTX Toolkit

