

TECHNICAL ASSURANCE

High Performance
Building Enclosure
Experts



Statement of
Qualifications

TECHNICAL ASSURANCE

Company Overview

Technical Assurance, Inc. is a nationally-recognized building consulting firm founded in 1993. Technical Assurance, Inc.'s current staff of professionals manages building enclosure consulting and design for assignments of varied size, scope and geographic location.

Our practice includes a considerable focus on solving a variety of building system deficiencies. Areas of expertise include roofs, façades, fenestrations (doors, windows and skylights), below-grade structures, parking areas and multi-level parking structures.





In addition, a number of the Technical Assurance clients engage the company to comprehensively manage their physical assets programmatically. These kinds of assignments generally include, predictive and preventative maintenance, capital budget integration and even client staff training.

We also have a full-service Commissioning Group to improve new construction building design and perform functional testing of the system during construction. Our Commissioning Group also performs Building Retro-Commissioning to improve existing building enclosure performance and energy loss.

Technical Assurance's success is due to our ability to lead the planning, design and implementation process for projects of any type, with a history of delivering projects on time and within budget. Our staff is committed to design excellence and client service with a team approach. Each program is approached individually, without preconceptions, and designed to serve the needs of the particular client – always with the goal of achieving excellence in delivery.

The professionals at Technical Assurance, Inc. have substantial critical facility industry experience. We have an extensive staff of consultants, engineers, field technicians, project and construction managers, database managers, GIS consultants, technical staff and office support. We maintain in-house capabilities to provide asset management and produce design drawings and project specs with complete cost estimating and budget preparation. Additionally, we continue to serve our clients with bidding services and construction administration during the entire course of the task, project, or program. Our services are sought primarily by those clients who value their building assets as "critical" in running their daily operations.

Points of Differentiation

-  Established knowledge of critical facility project standards, guidelines and safety and security requirements.
-  30 years of proven work experience providing planning, assessment, technical design consultation, construction observation, asset life cycle management and building enclosure commissioning (BECx) services.
-  Approximately \$100 million of building envelope restoration, replacement and repair projects completed by Technical Assurance on an annual basis.
-  Technical Assurance is one of the largest specialized building enclosure consulting and engineering firms in the United States.

SERVICE OVERVIEW



Building Envelope Asset Management

Technical Assurance's ON-PNT® allows facility owners the ability to manage building system inventory, condition assessments and ongoing building system data within one central location. This technology provides for robust GIS mapping and automated reporting metrics for simple data consumption.



Roof Consulting

We are your partner for total roof management. With a team of highly trained roofing specialists, we deliver comprehensive solutions for the assessment, design and implementation of roofing projects of any scope and size. Our programmatic approach to roof management ensures that your roofing investment is optimized to extend the service life of the roof system and to reduce the Total Cost of Ownership.



Façade Consulting & Structural Engineering

We offer vertical facade and structural engineering services including masonry and concrete exterior walls, curtain walls, balconies, exterior insulation finishes, fenestrations (doors, windows and skylights) and structural consulting to diagnose the cause of structural distress. We design repairs and restorative solutions that protect the structural integrity and aesthetic design of the building enclosure.



Parking Garage Consulting

Technical Assurance provides comprehensive consulting services for the restoration, repair and preventative maintenance of existing parking areas. Our deep understanding of the requirements for keeping your parking areas highly maintained and safe will help you operate with a low cost of ownership and extend the life of these necessary and valuable assets.



Exterior Hardscape Consulting

The exterior hardscape serves as a first impression and welcomes visitors to your facility. Regular maintenance of these areas will improve safety and increase the perceived value of your facility. Technical Assurance provides condition assessments, functional design consulting and durability recommendations.



Building Enclosure Commissioning

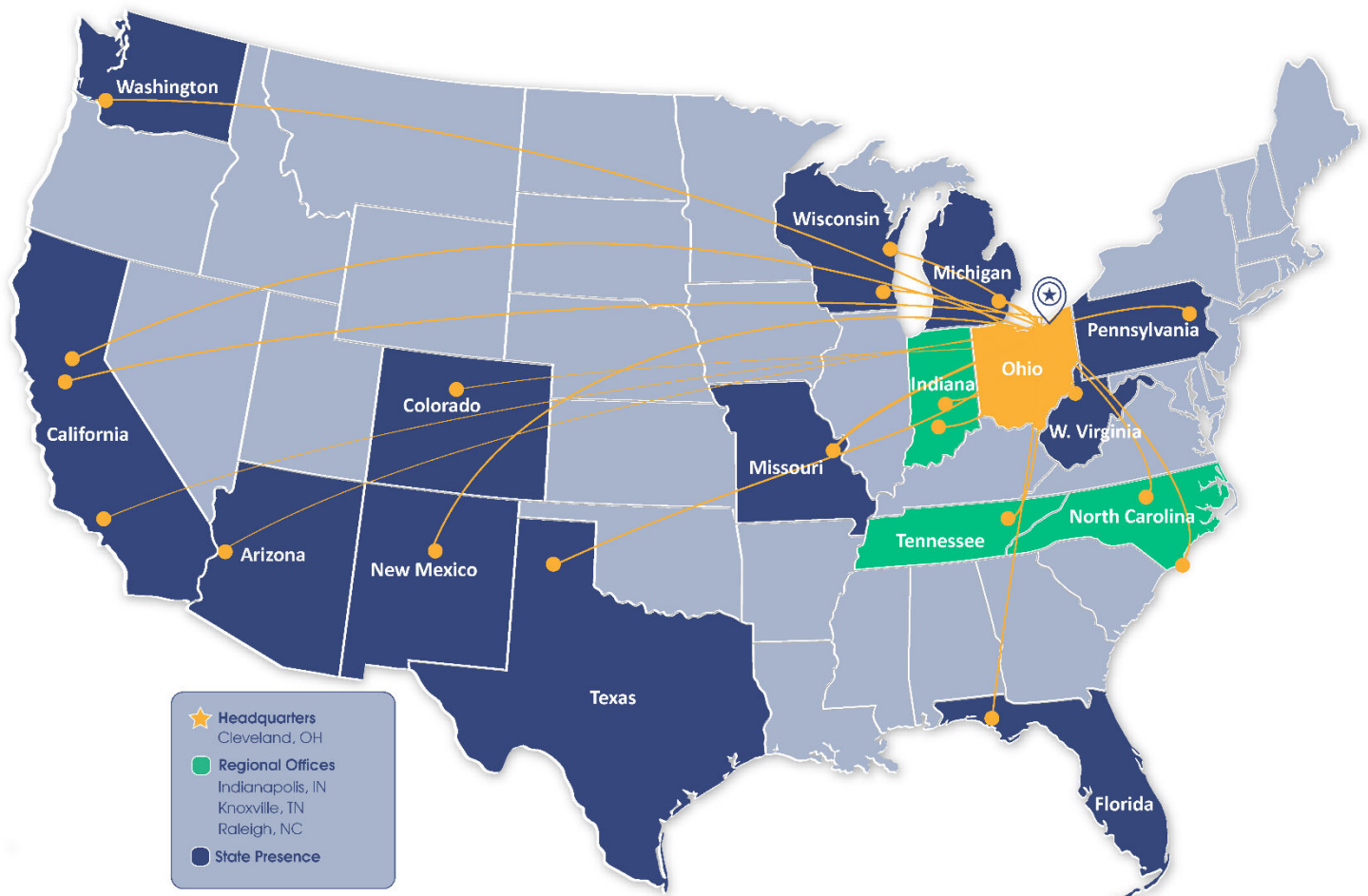
The full-serve BECx Group specializes in providing data-driven, quality improvement suggestions to new construction building design and performs functional testing during construction. Building enclosures directly affect the longevity and energy efficiency of a building. With a systematic approach to quality assurance, our BECx process improves the performance, safety and efficiency of a building and ensures that a project meets specific quality requirements.

GEOGRAPHIC COVERAGE

Technical Assurance has the capacity to provide national building enclosure consulting services. Our project-related field teams span across the United States, as we are continuously recruiting top talent in different markets in order to efficiently staff client program needs. We have successfully delivered roofing and building envelope projects across all 50 U.S. states and in Canada.

Office Locations

Headquarters	38112 Second Street, Willoughby, OH 44094
Raleigh, NC	301 Kilmayne Drive, Suite 204, Cary, NC 27511
Knoxville, TN	10426 Jackson Oaks Way, Suite 103, Knoxville, TN 37922
Indianapolis, IN	160 West Carmel Drive, Suite 244, Carmel, IN 46032



5 STEPS TO SUSTAINABILITY

Technical Assurance's unique 5 Steps to Sustainability process ensures thorough, superior results in program assessment, planning, design and management. Our process-driven approach allows our team to systematically lead all phases of building envelope programs — providing a framework for collaboration and creative solutions.

DISCOVER

Development of Owners Facilities Requirement (OFR), inspect, test, explore, excavate, evaluate and observe existing facilities and parking structures to develop an accurate condition assessment. This step frequently involves forensic investigation for facilities problems.

PLAN

Prepare and develop repair programs and capital plans along with work schedule priorities based on discovery phase findings.

SOLVE

Meet with the Owner's Team and develop design (construction documents, plans and specifications) solutions for all building and parking conditions requiring repair, restoration and/or remediation.

MANAGE

Manage and administer the construction process to ensure cost control, energy savings, quality assurance requirements and compliance with construction documents.

SUSTAIN

Implement and monitor preventative maintenance programs based on long-range component life-cycle forecast to reduce Total Cost of Ownership.



TECHNICAL ASSURANCE

**Project & Program
Experience**

NOVANT HEALTH

Client: Novant Health

Assignment: Roof, Façade and Parking Garage Assessments

Size:

Roof: 2,479,267 Square Feet

Walls: 2,602,053 Square Feet

Garage: 1,837,437 Square Feet

Fall Protection: 180 Components
over 738 Roof Areas

Over the course of two (2) phases, **Technical Assurance assessed the roofs, exterior façade and select parking garages on 13 medical and hospital centers.** The facilities assessed include:

- Brunswick Medical Center
- Clemmons Medical Center
- Forsyth Medical Center
- Kernersville Medical Center
- Medical Park Hospital Center
- Prince William Medical Center
- Charlotte Orthopedic Hospital
- Haymarket Medical Center
- Huntersville Medical Center
- Matthews Medical Center
- Presbyterian Medical Center
- Rowan Medical Center
- Thomasville Medical Center

The project included the inventory and assessment of millions square feet of assets in order to determine their condition index on a scale from 0-100, the remaining service life and total cost of ownership. All collected data was input in ON-PNT for the ongoing management of facility data. Following the assessment, the data was analyzed to determine what life extension efforts would be beneficial for extending the service life and lowering the total cost of ownership, and capital and repair projects were triaged to objectively determine the order in which those projects should be performed.

Technical Assurance is now working with Novant on designing repair and replacement projects, providing bid services and quality observation throughout the construction.



ABBOTT LABS

Client: Abbott Laboratories (Nutrition Division)

Assignment: Roof Asset Management Program Pilot

Size: 668,740 square feet

In December 2018, Technical Assurance performed an assessment on 11 buildings in Abbott Park as part of a Roof Asset Management Program Pilot. **The assessment included a mixture of manufacturing, distribution and administration buildings totaling approximately 668,740 square feet of roof assets.**

The scope of work included:

- A customized Abbott ON-PNT enterprise asset management web portal, including GIS poly line drawings of each building roof section.
- The inventory and assessment of each roof building, included photo overview of the section and observed deficiencies. All deficiency type, location and quantities were input into the ON-PNT database.
- Data collected included condition indices, total and remaining service life, replacement cost estimates, effect cost estimates, total cost of ownership savings associated with repair and maintenance programs, ad repair and ongoing preventative maintenance programs.
- Final condition assessment report

During the assessment, our team discovered that the roof sections were in varying conditions – Excellent, Good, Fair, Poor, Bad, Very Bad and Failed – on a scale of 0-100%. The Pilot Program assessment was completed successfully and the relationship with Abbott Labs Nutrition Division is still developing.

The screenshot displays the Technical Assurance ON-PNT web portal interface. It includes a header with the company logo and a sidebar with navigation options. The main content area shows a 'Roof Section' overview with a map and a table of assessment data. The table lists various roof sections with their respective IDs, addresses, and assessment details.

Location	Address
Abbott Park	Abbott Park Rd, Abbott Park, IL 60024
Building No.	8021
Survey Category	New Survey
Survey Type	Roof Related
Blg Height Est.	20.00

Roof Section	Roof ID	Address	Year Built	Year Built Est.	Unbraked	Roof System	Roof System Details	Roof System Group	SP	Assessor	Assessment Date
Abbott Park-8021-49-01	8021	Abbott Park Rd, Abbott Park, IL 60024	2000	2000	Yes	20110 Roof Coverings	Thermoplastics Ballasted	SP		Jan M. Smith	12/18/2018

Roof Overview Image: [Image of a roof section]

Condition: [Bar chart showing 44.26 %]



TAUSSIG CANCER INSTITUTE

Client: Cleveland Clinic

Assignment: Waterproofing and Roof Consultation

In 2014, Technical Assurance was engaged by the Cleveland Clinic to provide specialty waterproofing and roofing design consulting and quality observation services for the new Taussig Cancer Institute Project. The Cleveland Clinic Campus site is known for a high-water table. Without the proper design and installation of the appropriate waterproofing systems, many of their buildings and garages' foundation or basement systems would leak severely.

The waterproofing system design included a specialty inverted bentonite clay panel system installed under the concrete hydraulic slab and on the vertical walls with a hot applied rubberized asphaltic system on the upper walls and on below-grade concrete roof decks.

Considering the critical nature of the construction, our consultants observed the waterproofing installation on a daily basis. In addition to sub-grade waterproofing, services also included roof design assistance and thermography (IR) scans after the roof installation was complete.

Our relationship with the Cleveland Clinic is ongoing. Technical Assurance has completed over 20 projects for the health system, including numerous forensic investigations, waterproofing, roof, façade and building enclosure commissioning consulting services.



WOLSTEIN RESEARCH CENTER

Client: Case Western Reserve University / University Hospital

Assignment: Roof Remediation

Size: 36,500 SF

The Wolstein Research Building is an eight-story postmodern structure at Case Western Reserve University (CWRU) that shares research space with University Hospital. Eight (8) years after construction completed, Technical Assurance was called to investigate roof leaks. The built-up roof system was original to the building and was under the manufacturer's warranty at that time. The leaks presented in the building's stem cell research lab, among other locations, and had the potential to not only pose a real health risk but also to ruin the ongoing research, because the lab works with University Hospitals to provide stem cell therapy for patients.

Due to the sensitive nature of the work and the requirements to maintain a white-suit clean lab, these leaks needed to be stopped. Initial repairs to obvious damage were only minimally successful. Upon continued and increased broader investigations outside the immediate vicinity of the leak locations, Technical Assurance discovered that there were large areas of saturated insulation. These discoveries and the sensitive nature of the building requirements ultimately led to the decision to replace the relatively new roof system.

Technical Assurance was engaged to provide design services and to perform project management with full-time quality observation services during construction. In addition, Technical Assurance was also hired to ensure that the stem cell lab was able to remain open and operational at all times during the roofing project and do so within the stringent parameters required due to the sensitive nature of the research being conducted.

The roof replacement project was labor intensive and difficult due to several factors, among them being congested working areas. Due to the vast numbers, locations and sizes of rooftop HVAC equipment, vents, drains and other rooftop accessories, large equipment typically used to remove roofing with light weight insulating concrete was not viable and much of the work had to be done with more demanding and time-consuming measures.

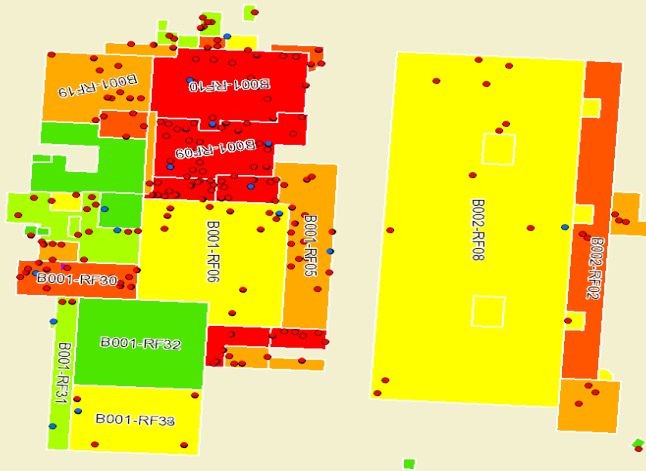
Throughout the project, several water leaks developed through the roof. The containment held with a 100% success rate. The stem cell lab did not have to shut down or relocate at all during the project and we were able to return the lab to its previous condition with confirmation of air quality through final testing.





TECHNICAL ASSURANCE

ON-PNT[®]
Simplified Asset
Management



ON-PNT®

Building System Asset Management Made Simple.

01

Enable a More Efficient Field Crew Data Collection

- > GIS PWA mobile app
- > Increases efficiency and effectiveness
- > App syncs with web portal every night

02

Brings Database to the Field & the Field to the Database

- > GIS integrated database
- > Easily visualize the condition of roof assets
- > Analyze effects of repairs and maintenance

03

Analysis & Reporting: Performance, Metrics & Goals

- > High level executive summary metrics (KPIs)
- > Scorecard review of building conditions
- > Custom reports & charts
- > Triage scores
- > Constrained budget analysis tool
- > GIS mapping

04

Simplified Management

- > Robust project management tool
- > Document & task management
- > Schedule & cost management
- > Data repository
- > Warranty management & reminders

The ON-PNT Enterprise Solution is a GIS-enabled database and web portal technology solution for:

- Building System Management
- Design Services and Bid Management
- Construction Management
- Sustainable Maintenance Management

ON-PNT allows facility owners the ability to manage building system inventory, condition assessments, repairs and ongoing building system data within one central location. This cutting-edge technology provides robust GIS mapping and automated reporting metrics for simplified data consumption.

ON-PNT is fully customizable per client. In fact, we build a unique ON-PNT Portal for each client program. This means we can incorporate each client's unique program nomenclature, ID system, special acronyms, custom metrics, etc.

A SCIENTIFIC APPROACH

The ON-PNT system provides repeatable and objective analysis using established facilities asset management (FAM) standards. The database is modeled using the following engineering standards:

- ✓ "Asset Lifecycle Model for Total Cost of Ownership," IFMA/APPA
- ✓ ASTM E917-05 Measuring Life-Cycle Costs of Buildings and Building Systems
- ✓ ASTM E1057-06 Measuring Internal Rate of Return and Adjusted Internal Rate of Return for Investments in Buildings and Building Systems
- ✓ ASTM E1121-12 Measuring Payback for Investments in Buildings and Building Systems
- ✓ ASTM E1765-11 Standard Practice for Applying Analytical Hierarchy Process (AHP) to Multi-Attribute Decision Analysis of investments related to Buildings and Building Systems

Using these standards to work within the structure of our database, we are able to ensure consistent findings and reporting with our Asset Management solution. The standards also allow us to bring in unique characteristics and attributes important to our clients from a non-monetary perspective.

RECOMMENDATIONS & BUDGETING

ON-PNT® includes a built-in Business Intelligence for Capital and O&M budgeting and planning, along with work schedule priorities based on discovery phase findings. The automated budgeting reports include scientific methodology for ranking capital replacements and repair projects. The Triage Budget Report and Project analyzer tool is based upon the:

- ✓ Building or building system Condition Index (CI)
- ✓ Mission Dependency Index (MDI)
- ✓ System Component Index (SCI)
- ✓ Total Cost of Ownership (TCO)

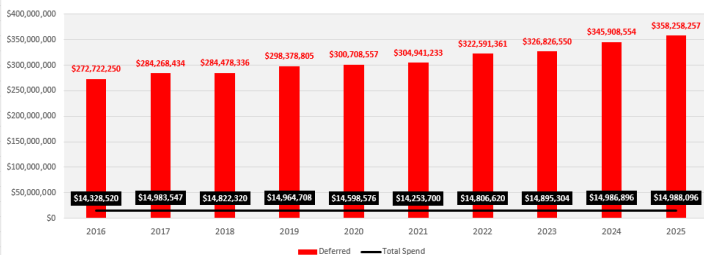


ON-PNT lets you generate ad-hoc Triage Budget Plans based upon set budget constraints. You can also set your organization's inflationary rate and/or cost of capital or value of cash percentage rate. Once constraints and other rates are set, you can easily generate Triage Budget Plan and/or special Spend Plan and Deferred Maintenance Reports.

10-Year Spend: \$15 million/Year

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Spend	\$14,328,520	\$14,983,547	\$14,822,320	\$14,964,708	\$14,596,576	\$14,253,700	\$14,806,620	\$14,895,304	\$14,986,896	\$14,988,096
Total TSL Budget	\$272,722,250	\$26,529,731	\$15,032,222	\$28,865,177	\$16,928,328	\$18,486,376	\$32,456,748	\$19,130,493	\$34,068,900	\$27,337,799
Deferred	\$272,722,250	\$284,268,434	\$284,478,336	\$298,378,805	\$300,708,557	\$304,941,233	\$322,591,361	\$326,826,550	\$345,908,554	\$358,258,257

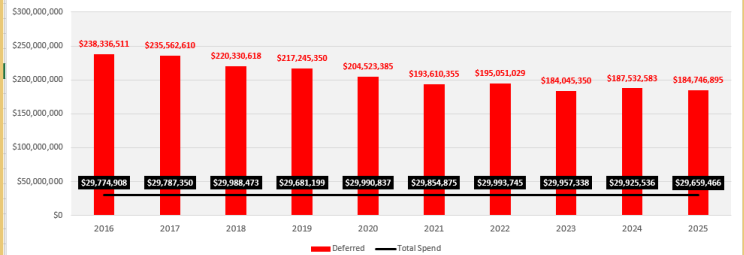
FY16-FY25 Spend Plan



10-Year Spend: \$30 million/Year

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Spend	\$29,774,908	\$29,787,350	\$29,988,473	\$29,681,199	\$29,990,837	\$29,854,875	\$29,993,745	\$29,957,338	\$29,925,536	\$29,659,466
Total TSL Budget	\$238,336,511	\$27,001,006	\$14,555,359	\$26,903,204	\$16,959,235	\$17,622,856	\$31,295,549	\$18,988,066	\$33,444,571	\$27,139,848
Deferred	\$238,336,511	\$235,562,610	\$220,330,618	\$217,245,350	\$204,523,385	\$193,610,355	\$195,051,029	\$184,045,350	\$187,532,583	\$184,746,895

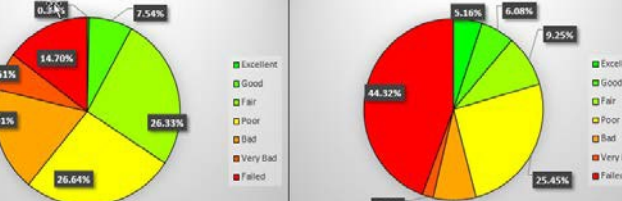
FY16-FY25 Spend Plan



Condition-2016	Count	%	SF	CRV	Condition-2025	Count	%	SF	CRV
Excellent	19	0.36%	141,501	\$5,215,598	Excellent	269	5.16%	965,418	\$39,233,204
Good	393	7.54%	1,519,097	\$60,841,379	Good	317	6.08%	1,007,499	\$39,538,521
Fair	1372	26.33%	4,886,607	\$203,565,215	Fair	482	9.25%	2,017,074	\$80,994,534
Poor	1388	26.64%	5,305,070	\$219,412,653	Poor	1326	25.45%	3,787,815	\$169,022,567
Bad	933	17.91%	3,251,802	\$128,076,573	Bad	403	7.74%	1,550,015	\$65,712,981
Very Bad	339	6.51%	1,337,673	\$51,012,639	Very Bad	104	2.00%	496,605	\$19,251,096
Failed	766	14.70%	3,163,517	\$112,813,771	Failed	2309	44.32%	9,780,841	\$367,184,915
	5210	100.00%	19,605,267	\$780,937,828		5210	100.00%	19,605,267	\$780,937,828

TSL: 2016 Conditions BEFORE

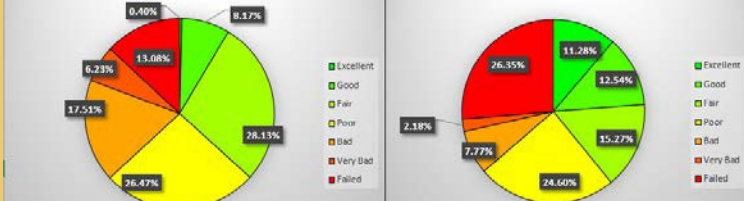
TSL: 2025 Conditions AFTER



Condition-2016	Count	%	SF	CRV	Condition-2025	Count	%	SF	CRV
Excellent	20	0.40%	264,957	\$9,900,754	Excellent	563	11.28%	1,887,177	\$78,736,089
Good	408	8.17%	1,574,667	\$63,700,151	Good	626	12.54%	2,188,687	\$84,679,447
Fair	1404	28.13%	5,106,632	\$210,494,982	Fair	762	15.27%	3,352,259	\$131,195,586
Poor	1321	26.47%	4,972,542	\$205,112,767	Poor	1228	24.60%	3,440,155	\$152,941,882
Bad	874	17.51%	3,203,208	\$125,852,664	Bad	388	7.77%	1,440,571	\$61,339,598
Very Bad	311	6.23%	1,248,197	\$47,475,983	Very Bad	109	2.18%	488,327	\$18,441,678
Failed	653	13.08%	2,827,875	\$85,563,876	Failed	1315	26.35%	5,900,992	\$220,766,897
	4991	100.00%	18,698,168	\$748,101,177		4991	100.00%	18,698,168	\$748,101,177

TSL: 2016 Conditions BEFORE

TSL: 2025 Conditions AFTER



Building System Asset Management Made Simple.

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Simplified Management

- Robust project management tool
- Document & task management
- Schedule & cost management
- Data repository
- Warranty management & reminders



REQUEST A CONSULTATION

We would love to talk with you about your facility needs.
Connect with us on our [website](#) to request a consultation.

Or Contact:

Liam Flannery, Director of National Sales
(919) 637-1444

Lflannery@technicalassurance.com